

STATE MATCH SUPPLEMENT

Georgia Performance Standards Mathematics Grades 8–12

and

EXPLORE[®], PLAN[®], the ACT[®], and WorkKeys[®]

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List of Supplement Tables

Table		Page
Α	GEORGIA Grade 8 Mathematics Performance Standards with Corresponding EXPLORE College Readiness Standards	S-1
В	GEORGIA Mathematics 1 Performance Standards with Corresponding EXPLORE College Readiness Standards	S-10
С	GEORGIA Mathematics 1 Performance Standards with Corresponding PLAN College Readiness Standards	S-18
D	GEORGIA Mathematics 2 Performance Standards with Corresponding PLAN College Readiness Standards	S-27
Е	GEORGIA Mathematics 2 Performance Standards with Corresponding ACT College Readiness Standards	S-36
F	GEORGIA Mathematics 3 Performance Standards with Corresponding ACT College Readiness Standards	S-49
G	GEORGIA Mathematics 3 Performance Standards with Corresponding WorkKeys Level Skills	S-62
н	GEORGIA Mathematics 4 Performance Standards with Corresponding ACT College Readiness Standards	S-70
I	GEORGIA Mathematics 4 Performance Standards with Corresponding WorkKeys Level Skills	S-82
J	GEORGIA Core Math 1 Performance Standards with Corresponding EXPLORE College Readiness Standards	S-89
К	GEORGIA Core Math 1 Performance Standards with Corresponding PLAN College Readiness Standards	S-95
L	GEORGIA Core Math 2 Performance Standards with Corresponding PLAN College Readiness Standards	S-102
М	GEORGIA Core Math 3 Performance Standards with Corresponding ACT College Readiness Standards	S-110
Ν	GEORGIA Core Math 3 Performance Standards with Corresponding WorkKeys Level Skills	S-121
0	GEORGIA Core Math 4 Performance Standards with Corresponding ACT College Readiness Standards	S-127
Ρ	GEORGIA Core Math 4 Performance Standards with Corresponding WorkKeys Level Skills	S-138
Q	GEORGIA Accelerated Math 1 Performance Standards with Corresponding ACT College Readiness Standards	S-144
R	GEORGIA Accelerated Math 1 Performance Standards with Corresponding WorkKeys Level Skills	S-159
S	GEORGIA Accelerated Math 2 Performance Standards with Corresponding ACT College Readiness Standards	S-166
т	GEORGIA Accelerated Math 2 Performance Standards with Corresponding WorkKeys Level Skills	S-180
U	GEORGIA Accelerated Math 3 Performance Standards with Corresponding ACT College Readiness Standards	S-189
v	GEORGIA Accelerated Math 3 Performance Standards with Corresponding WorkKeys Level Skills	S-201





Preface

This document is a supplement to the *State Match Georgia Performance Standards English Language Arts, Mathematics, and Science Grades 8–12 and ACT's EXPLORE, PLAN, the ACT, and WorkKeys (January 2008).* This supplement identifies specific ACT College Readiness Standards that correspond to each Georgia Performance Standard in a side-by-side format. The left side of each page presents the Georgia Performance Standards (highlighted if measured by ACT's corresponding testing program). The right side of each page presents the specific ACT College Readiness Standard(s) and WorkKeys Level Skill(s) that correspond to each Georgia Performance Standard.

Georgia standards listed here are from the Georgia Performance Standards as presented on the Georgia Department of Education's website in October 2007.





SUPPLEMENT TABLES A-V:

MATHEMATICS

GE Pe	ORGIA Grade 8 Mathematics	EXPLORE Mathematics College Readiness Standards
NU	IMBER AND OPERATIONS	
Stu me exp	dents will understand the numeric and geometric aning of square root, apply properties of integer ponents and use scientific notation.	
M8 nur not	N1. Students will understand different representations of nbers including square roots, exponents, and scientific ation.	
a.	Find square roots of perfect squares.	Numbers: Concepts & Properties: Work with squares and square roots of numbers
b.	Recognize the (positive) square root of a number as a length of a side of a square with a given area.	
C.	Recognize square roots as points and as lengths on a number line.	Graphical Representations: Identify the location of a point with a positive coordinate on the number line
d.	Understand that the square root of 0 is 0 and that every positive number has two square roots that are opposite in sign.	Numbers: Concepts & Properties: Work with squares and square roots of numbers
e.	Recognize and use the radical symbol to denote the positive square root of a positive number.	Numbers: Concepts & Properties: Work with squares and square roots of numbers
f.	Estimate square roots of positive numbers.	Numbers: Concepts & Properties: Work with squares and square roots of numbers
g.	Simplify, add, subtract, multiply, and divide expressions containing square roots.	
h.	Distinguish between rational and irrational numbers.	
i.	Simplify expressions containing integer exponents.	
j.	Express and use numbers in scientific notation.	Numbers: Concepts & Properties: Work with scientific notation
k.	Use appropriate technologies to solve problems involving square roots, exponents, and scientific notation.	
GE	OMETRY	
Stu figu the	dents will use and apply geometric properties of plane ires, including congruence and the Pythagorean orem.	
M8 par me	G1. Students will understand and apply the properties of allel and perpendicular lines and understand the aning of congruence.	
a.	Investigate characteristics of parallel and perpendicular lines both algebraically and geometrically.	
b.	Apply properties of angle pairs formed by parallel lines cut by a transversal.	Properties of Plane Figures: Exhibit some knowledge of the angles associated with parallel lines Find the measure of an angle using properties of parallel

 Understand the properties of the ratio of segments of parallel lines cut by one or more transversals. lines

GE	ORGIA Grade 8 Mathematics	EXPLORE Mathematics	
Ре	rformance Standards	College Readiness Standards	
d.	Understand the meaning of congruence: that all corresponding angles are congruent and all corresponding sides are congruent.		
M8	G2. Students will understand and use the Pythagorean		
the	orem.		
а.	Apply properties of right triangles, including the Pythagorean theorem.		
b.	Recognize and interpret the Pythagorean theorem as a statement about areas of squares on the sides of a right triangle.		
AL	GEBRA		
Stu solv to i par	Students will use linear algebra to represent, analyze and solve problems. They will use equations, tables, and graphs to investigate linear relations and functions, paying particular attention to slope as a rate of change.		
M8 solv	A1. Students will use algebra to represent, analyze, and /e problems.		
a.	Represent a given situation using algebraic	Expressions, Equations, & Inequalities:	
	expressions or equations in one variable.	Perform straightforward word-to-symbol translations	
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)	
b.	Simplify and evaluate algebraic expressions.	Expressions, Equations, & Inequalities:	
		Substitute whole numbers for unknown quantities to evaluate expressions	
		Combine like terms (e.g., $2x + 5x$)	
		Evaluate algebraic expressions by substituting integers for unknown quantities	
		Add and subtract simple algebraic expressions	
C.	Solve algebraic equations in one variable, including	Expressions, Equations, & Inequalities:	
	equations involving absolute values.	Solve equations in the form $x + a = b$, where a and b are whole numbers or decimals	
		Solve one-step equations having integer or decimal answers	
		Solve routine first-degree equations	
		Solve real-world problems using first-degree equations	
d.	Solve equations involving several variables for one variable in terms of the others.		
e.	Interpret solutions in problem contexts.		
M8 one	M8A2. Students will understand and graph inequalities in one variable.		
a.	Represent a given situation using an inequality in one	Expressions, Equations, & Inequalities:	
	variable.	Perform straightforward word-to-symbol translations	
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)	

GEORGIA Grade 8 Mathematics		EXPLORE Mathematics	
Performance Standards		College Readiness Standards	
b.	Use the properties of inequality to solve inequalities.		
C.	Graph the solution of an inequality on a number line.		
d.	Interpret solutions in problem contexts.		
M8 fun	A3. Students will understand relations and linear ctions.		
а.	Recognize a relation as a correspondence between varying quantities.		
b.	Recognize a function as a correspondence between inputs and outputs where the output for each input must be unique.		
C.	Distinguish between relations that are functions and those that are not functions.		
d.	Recognize functions in a variety of representations and a variety of contexts.		
e.	Use tables to describe sequences recursively and with	Probability, Statistics, & Data Analysis:	
	a formula in closed form.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)	
f.	Understand and recognize arithmetic sequences as linear functions with whole number input values.		
g.	Interpret the constant difference in an arithmetic sequence as the slope of the associated linear function.		
h.	Identify relations and functions as linear or nonlinear.		
i.	Translate among verbal, tabular, graphic, and algebraic	Probability, Statistics, & Data Analysis:	
	representations of functions.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)	
		Expressions, Equations, & Inequalities:	
		Perform straightforward word-to-symbol translations	
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)	
M8 <mark>equ</mark>	M8A4. Students will graph and analyze graphs of linear equations and inequalities.		
a.	Interpret slope as a rate of change.		
b.	Determine the meaning of the slope and <i>y</i> -intercept in a given situation.		
C.	Graph equations of the form $y = mx + b$.		
d.	Graph equations of the form $ax + by = c$.		
e.	Graph the solution set of a linear inequality, identifying whether the solution set is an open or a closed half- plane.		

GE	ORGIA Grade 8 Mathematics	EXPLORE Mathematics
Pe	rformance Standards	Conege Readiness Standards
t.	Determine the equation of a line given a graph, numerical information that defines the line or a context	Probability, Statistics, & Data Analysis:
	involving a linear relationship.	a bar graph to a circle graph)
		Expressions, Equations, & Inequalities:
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
g.	Solve problems involving linear relationships.	Expressions, Equations, & Inequalities:
Ũ		Solve real-world problems using first-degree equations
M8	A5. Students will understand systems of linear	
<mark>eqı</mark>	uations and inequalities and use them to solve problems.	
a.	Given a problem context, write an appropriate system	Expressions, Equations, & Inequalities:
	of linear equations of inequalities.	Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
b.	Solve systems of equations graphically and algebraically, using technology as appropriate.	
C.	Graph the solution set of a system of linear inequalities in two variables.	
d.	Interpret solutions in problem contexts.	
DA	ATA ANALYSIS AND PROBABILITY	
Stu cou sim dat	Students will use and understand set theory and simple counting techniques; determine the theoretical probability of simple events; and make inferences from data, particularly data that can be modeled by linear functions.	
M8	D1. Students will apply basic concepts of set theory.	
a.	Demonstrate relationships among sets through use of Venn diagrams.	
b.	Determine subsets, complements, intersection, and union of sets.	
C.	Use set notation to denote elements of a set.	
M8 rela	M8D2. Students will determine the number of outcomes related to a given event.	
a.		
	Use tree diagrams to find the number of outcomes.	
b.	Use tree diagrams to find the number of outcomes. Apply the addition and multiplication principles of counting.	
b. M8	Use tree diagrams to find the number of outcomes. Apply the addition and multiplication principles of counting. D3. Students will use the basic laws of probability.	
b. M8 a.	Use tree diagrams to find the number of outcomes. Apply the addition and multiplication principles of counting. D3. Students will use the basic laws of probability. Find the probability of simple independent events.	Probability, Statistics, & Data Analysis:
b. M8 a.	Use tree diagrams to find the number of outcomes. Apply the addition and multiplication principles of counting. D3. Students will use the basic laws of probability. Find the probability of simple independent events.	Probability, Statistics, & Data Analysis: Use the relationship between the probability of an event and the probability of its complement
b. M8 a.	Use tree diagrams to find the number of outcomes. Apply the addition and multiplication principles of counting. D3. Students will use the basic laws of probability. Find the probability of simple independent events.	Probability, Statistics, & Data Analysis: Use the relationship between the probability of an event and the probability of its complement Determine the probability of a simple event
b. M8 a. b.	Use tree diagrams to find the number of outcomes. Apply the addition and multiplication principles of counting. D3. Students will use the basic laws of probability. Find the probability of simple independent events.	Probability, Statistics, & Data Analysis: Use the relationship between the probability of an event and the probability of its complement Determine the probability of a simple event Probability, Statistics, & Data Analysis:

GEORGIA Grade 8 Mathematics Performance Standards	EXPLORE Mathematics College Readiness Standards
M8D4. Students will organize, interpret, and make inferences from statistical data	
a. Gather data that can be modeled with a linear function.	
b. Estimate and determine a line of best fit from a scatter	Probability, Statistics, & Data Analysis:
plot.	Perform computations on data from tables and graphs
PROCESS STANDARDS	
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.	
M8P1. Students will solve problems (using appropriate technology).	
 Build new mathematical knowledge through problem solving. 	
b. Solve problems that arise in mathematics and in other	Basic Operations & Applications:
contexts.	Perform one-operation computation with whole numbers and decimals
	Solve problems in one or two steps using whole numbers
	Perform common conversions (e.g., inches to feet or hours to minutes)
	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent
	Solve some routine two-step arithmetic problems
	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average
	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)
	Probability, Statistics, & Data Analysis:
	Calculate the average of a list of positive whole numbers
	Perform a single computation using information from a table or chart
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Read tables and graphs
	Perform computations on data from tables and graphs
	Use the relationship between the probability of an event and the probability of its complement
	Calculate the missing data value, given the average and all data values but one
	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Determine the probability of a simple event
	Calculate the average, given the frequency counts of all the data values

GEORGIA Grade 8 Mathematics Performance Standards	EXPLORE Mathematics College Readiness Standards
	Manipulate data from tables and graphs
	Compute straightforward probabilities for common situations
	Numbers: Concepts & Properties:
	Recognize equivalent fractions and fractions in lowest terms
	Recognize one-digit factors of a number
	Identify a digit's place value
	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	Find and use the least common multiple
	Order fractions
	Work with numerical factors
	Work with scientific notation
	Work with squares and square roots of numbers
	Expressions, Equations, & Inequalities:
	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)
	Solve equations in the form $x + a = b$, where <i>a</i> and <i>b</i> are whole numbers or decimals
	Substitute whole numbers for unknown quantities to evaluate expressions
	Solve one-step equations having integer or decimal answers
	Combine like terms (e.g., $2x + 5x$)
	Evaluate algebraic expressions by substituting integers for unknown quantities
	Add and subtract simple algebraic expressions
	Solve routine first-degree equations
	Perform straightforward word-to-symbol translations
	Solve real-world problems using first-degree equations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Identify solutions to simple quadratic equations
	Graphical Representations:
	Identify the location of a point with a positive coordinate on the number line
	Locate points on the number line and in the first quadrant
	Locate points in the coordinate plane
	Properties of Plane Figures:
	Exhibit some knowledge of the angles associated with parallel lines

GEORGIA Grade 8 Mathematics Performance Standards		EXPLORE Mathematics College Readiness Standards
		Find the measure of an angle using properties of parallel lines
		Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
		Use several angle properties to find an unknown angle measure
		Measurement:
		Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
		Compute the perimeter of polygons when all side lengths are given
		Compute the area of rectangles when whole number dimensions are given
		Compute the area and perimeter of triangles and rectangles in simple problems
		Use geometric formulas when all necessary information is given
		Compute the area of triangles and rectangles when one or more additional simple steps are required
		Compute the area and circumference of circles after identifying necessary information
C.	Apply and adapt a variety of appropriate strategies to solve problems.	
d.	Monitor and reflect on the process of mathematical problem solving.	
M8 arg	P2. Students will reason and evaluate mathematical uments.	
a.	Recognize reasoning and proof as fundamental aspects of mathematics.	
b.	Make and investigate mathematical conjectures.	
C.	Develop and <mark>evaluate mathematical arguments and proofs.</mark>	
d.	Select and use various types of reasoning and methods of proof.	
M8	P3. Students will communicate mathematically.	
a.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
C.	Analyze and evaluate the mathematical thinking and strategies of others.	
d.	Use the language of mathematics to express	Expressions, Equations, & Inequalities:
	mathematical ideas precisely.	Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)

GEORGIA Grade 8 Mathematics Performance Standards		EXPLORE Mathematics College Readiness Standards	
M8 ma	M8P4. Students will make connections among mathematical ideas and to other disciplines.		
a.	Recognize and use connections among mathematical ideas.		
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.		
C.	Recognize and apply mathematics in contexts outside of mathematics.		
M8 wa	M8P5. Students will represent mathematics in multiple ways.		
а.	Create and use representations to organize, record,	Probability, Statistics, & Data Analysis:	
	and communicate mathematical ideas.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)	
b.	Select, apply, and translate among mathematical representations to solve problems.		
C.	Use representations to model and interpret physical,	Probability, Statistics, & Data Analysis:	
	social, and mathematical phenomena.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)	
		Manipulate data from tables and graphs	
		Expressions, Equations, & Inequalities:	
		Perform straightforward word-to-symbol translations	
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)	
M	ATH READING CONTENT		
Stu	idents will enhance reading in all curriculum areas by:		
а.	Reading in all curriculum areas		
	• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas		
	• Read both informational and fictional texts in a variety of genres and modes of discourse		
	Read technical texts related to various subject areas		
b.	Discussing books		
	 Discuss messages and themes from books in all subject areas. 		
	 Respond to a variety of texts in multiple modes of discourse. 		
	 Relate messages and themes from one subject area to messages and themes in another area. 		
	• Evaluate the merit of texts in every subject discipline.		
	 Examine author's purpose in writing. 		
	 Recognize the features of disciplinary texts. 		

GEORGIA Grade 8 Mathematics Performance Standards		EXPLORE Mathematics College Readiness Standards
C.	Building vocabulary knowledge	
	 Demonstrate an understanding of contextual vocabulary in various subjects. 	
	 Use content vocabulary in writing and speaking. 	
	• Explore understanding of new words found in subject area texts.	
d.	Establishing context.	
	 Explore life experiences related to subject area content. 	
	 Discuss in both writing and speaking how certain words are subject area related. 	
	 Determine strategies for finding content and contextual meaning for unknown words. 	

GEORGIA Mathematics 1 Performance Standards

EXPLORE Mathematics College Readiness Standards

ALGEBRA		
Students will explore functions and solve simple equations. Students will simplify and operate with radical, polynomial, and rational expressions.		
MM1A1. Students will explore and interpret the characteristics of functions, using graphs, tables, and simple algebraic techniques.		
a. Represent functions using function notation.		
b. Graph the basic functions $f(x) = x^n$, where $n = 1$ to 3, $f(x) = \sqrt{x}$, $f(x) = x $, and $f(x) = \frac{1}{x}$.		
 Graph transformations of basic functions including vertical shifts, stretches, and shrinks, as well as reflections across the <i>x</i>- and <i>y</i>-axes. 		
 Investigate and explain the characteristics of a function: domain, range, zeros, intercepts, intervals of increase and decrease, maximum and minimum values, and end behavior. 		
 Relate to a given context the characteristics of a function, and use graphs and tables to investigate its behavior. 		
 Recognize sequences as functions with domains that are whole numbers. 		
g. Explore rates of change, comparing constant rates of change (i.e., slope) versus variable rates of change. Compare rates of change of linear, quadratic, square root, and other function families.		
 Determine graphically and algebraically whether a function has symmetry and whether it is even, odd, or neither. 		
i. Understand that any equation in <i>x</i> can be interpreted as the equation $f(x) = g(x)$, and interpret the solutions of the equation as the <i>x</i> -value(s) of the intersection point(s) of the graphs of $y = f(x)$ and $y = g(x)$.		
MM1A2. Students will simplify and operate with radical expressions, polynomials, and rational expressions.		
 Simplify algebraic and numeric expressions involving square root. 	Numbers: Concepts & Properties: Work with squares and square roots of numbers	
b. Perform operations with square roots.		
c. Add, subtract, multiply, and divide polynomials.	Expressions, Equations, & Inequalities:	
	Combine like terms (e.g., $2x + 5x$)	
	Add and subtract simple algebraic expressions	
d. Expand binomials using the Binomial Theorem.		
e. Add, subtract, multiply, and divide rational expressions.		

GE Pe	ORGIA Mathematics 1 rformance Standards	EXPLORE Mathematics College Readiness Standards
f.	Factor expressions by greatest common factor, grouping, trial and error, and special products limited to the formulas below. $(x + y)^2 = x^2 + 2xy + y^2$ $(x - y)^2 = x^2 - 2xy + y^2$ $(x + y)(x - y) = x^2 - y^2$ $(x + a)(x + b) = x^2 + (a + b)x + ab$ $(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$ $(x - y)^3 = x^3 - 3x^2y + 3xy^2 - y^3$	
g.	Use area and volume models for polynomial arithmetic.	Expressions, Equations, & Inequalities: Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
MN	I1A3. Students will solve simple equations.	
a.	Solve quadratic equations in the form $ax^2 + bx + c = 0$, where $a = 1$, by using factorization and finding square roots where applicable.	
b.	Solve equations involving radicals such as $\sqrt{x} + b = c$, using algebraic techniques.	
C.	Use a variety of techniques, including technology, tables, and graphs to solve equations resulting from the investigation of $x^2 + bx + c = 0$.	
d.	Solve simple rational equations that result in linear equations or quadratic equations with leading coefficient of 1.	
GEOMETRY		
Students will explore, understand, and use the formal language of reasoning and justification. Students will apply properties of polygons and determine distances and points of concurrence.		
MN figu	I1G1. Students will investigate properties of geometric ures in the coordinate plane.	
a.	Determine the distance between two points.	
b.	Determine the distance between a point and a line.	
С.	Determine the midpoint of a segment.	
d.	Understand the distance formula as an application of the Pythagorean theorem.	
e.	Use the coordinate plane to investigate properties of and verify conjectures related to triangles and quadrilaterals.	
MN ma	IIG2. Students will understand and use the language of the the term the term the term term term term term term term ter	
a.	Use conjecture, inductive reasoning, deductive reasoning, counterexamples, and indirect proof as appropriate.	
b.	Understand and use the relationships among a statement and its converse, inverse, and contrapositive.	

GEORGIA Mathematics 1 Performance Standards	EXPLORE Mathematics College Readiness Standards	
MM1G3. Students will discover, prove, and apply properties of triangles, quadrilaterals, and other polygons.		
a. Determine the sum of interior and exterior angles in a polygon.	Properties of Plane Figures: Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°) Use several angle properties to find an unknown angle measure	
b. Understand and use the triangle inequality, the side- angle inequality, and the exterior-angle inequality.		
c. Understand and use congruence postulates and theorems for triangles (SSS, SAS, ASA, AAS, HL).		
d. Understand, use, and prove properties of and relationships among special quadrilaterals: parallelogram, rectangle, rhombus, square, trapezoid, and kite.	Properties of Plane Figures: Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°) Use several angle properties to find an unknown angle measure	
e. Find and use points of concurrency in triangles: incenter, orthocenter, circumcenter, and centroid.		
DATA ANALYSIS AND PROBABILITY		
Students will use counting techniques and determine probability. Students will demonstrate understanding of data analysis by posing questions to be answered by collecting data. Students will organize, represent, investigate, interpret, and make inferences from data.		
MM1D1. Students will determine the number of outcomes related to a given event.		
a. Apply the addition and multiplication principles of counting.		
 b. Calculate and use simple permutations and combinations. 		
MM1D2. Students will use the basic laws of probability.		
a. Find the probabilities of mutually exclusive events.	Probability, Statistics, & Data Analysis: Determine the probability of a simple event Compute straightforward probabilities for common situations	
b. Find the probabilities of dependent events.	Probability, Statistics, & Data Analysis: Compute straightforward probabilities for common situations	
c. Calculate conditional probabilities.		
d. Use expected value to predict outcomes.		
MM1D3. Students will relate samples to a population.		
a. Compare summary statistics (mean, median, quartiles, and interquartile range) from one sample data distribution to another sample data distribution in describing center and variability of the data distributions.		
b. Compare the averages of the summary statistics from a large number of samples to the corresponding population parameters.		

GEORGIA Mathematics 1	EXPLORE Mathematics
- Understand that a random sample is used to improve	College Readiness Standards
the chance of selecting a representative sample.	
MM1D4. Students will explore variability of data by determining the mean absolute deviation (the average of the absolute values of the deviations).	
PROCESS STANDARDS	
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.	
MM1P1. Students will solve problems (using appropriate technology).	
 Build new mathematical knowledge through problem solving. 	
b. Solve problems that arise in mathematics and in other	Basic Operations & Applications:
contexts.	Perform one-operation computation with whole numbers and decimals
	Solve problems in one or two steps using whole numbers
	Perform common conversions (e.g., inches to feet or hours to minutes)
	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent
	Solve some routine two-step arithmetic problems
	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average
	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)
	Probability, Statistics, & Data Analysis:
	Calculate the average of a list of positive whole numbers
	Perform a single computation using information from a table or chart
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Read tables and graphs
	Perform computations on data from tables and graphs
	Use the relationship between the probability of an event and the probability of its complement
	Calculate the missing data value, given the average and all data values but one
	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Determine the probability of a simple event
	Calculate the average, given the frequency counts of all the data values

GEORGIA Mathematics 1 Performance Standards	EXPLORE Mathematics
	Manipulate data from tables and graphs
	Compute straightforward probabilities for common situations
	Numbers: Concepts & Properties:
	Recognize equivalent fractions and fractions in lowest terms
	Recognize one-digit factors of a number
	Identify a digit's place value
	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	Find and use the least common multiple
	Order fractions
	Work with numerical factors
	Work with scientific notation
	Work with squares and square roots of numbers
	Expressions, Equations, & Inequalities:
	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)
	Solve equations in the form $x + a = b$, where <i>a</i> and <i>b</i> are whole numbers or decimals
	Substitute whole numbers for unknown quantities to evaluate expressions
	Solve one-step equations having integer or decimal answers
	Combine like terms (e.g., $2x + 5x$)
	Evaluate algebraic expressions by substituting integers for unknown quantities
	Add and subtract simple algebraic expressions
	Solve routine first-degree equations
	Perform straightforward word-to-symbol translations
	Solve real-world problems using first-degree equations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Identify solutions to simple quadratic equations
	Graphical Representations:
	Identify the location of a point with a positive coordinate on the number line
	Locate points on the number line and in the first quadrant
	Locate points in the coordinate plane
	Properties of Plane Figures:
	Exhibit some knowledge of the angles associated with parallel lines

GE Pe	ORGIA Mathematics 1 rformance Standards	EXPLORE Mathematics College Readiness Standards
		Find the measure of an angle using properties of parallel lines
		Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
		Use several angle properties to find an unknown angle measure
		Measurement:
		Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
		Compute the perimeter of polygons when all side lengths are given
		Compute the area of rectangles when whole number dimensions are given
		Compute the area and perimeter of triangles and rectangles in simple problems
		Use geometric formulas when all necessary information is given
		Compute the area of triangles and rectangles when one or more additional simple steps are required
		Compute the area and circumference of circles after identifying necessary information
C.	Apply and adapt a variety of appropriate strategies to solve problems.	
d.	Monitor and reflect on the process of mathematical problem solving.	
MN arg	11P2. Students will reason and evaluate mathematical uments.	
a.	Recognize reasoning and proof as fundamental aspects of mathematics.	
b.	Make and investigate mathematical conjectures.	
C.	Develop and <mark>evaluate mathematical arguments and proofs.</mark>	
d.	Select and use various types of reasoning and methods of proof.	
MN	11P3. Students will communicate mathematically.	·
a.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
C.	Analyze and evaluate the mathematical thinking and strategies of others.	
d.	Use the language of mathematics to express	Expressions, Equations, & Inequalities:
	mathematical ideas precisely.	Perform straightforward word-to-symbol translations Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)

GE	EORGIA Mathematics 1	EXPLORE Mathematics	
Ре	rformance Standards	College Readiness Standards	
MN ma	MM1P4. Students will make connections among mathematical ideas and to other disciplines.		
a.	Recognize and use connections among mathematical ideas.		
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.		
C.	Recognize and apply mathematics in contexts outside of mathematics.		
MN <mark>wa</mark>	I1P5. Students will represent mathematics in multiple ys.		
a.	Create and use representations to organize, record,	Probability, Statistics, & Data Analysis:	
	and communicate mathematical ideas.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)	
b.	Select, apply, and translate among mathematical representations to solve problems.		
c.	Use representations to model and interpret physical,	Probability, Statistics, & Data Analysis:	
	social, and mathematical phenomena.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)	
		Manipulate data from tables and graphs	
		Expressions, Equations, & Inequalities:	
		Perform straightforward word-to-symbol translations	
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)	
M	MATH READING CONTENT		
Students will enhance reading in all curriculum areas by:			
а.	Reading in all curriculum areas		
	• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas		
	• Read both informational and fictional texts in a variety of genres and modes of discourse		
	Read technical texts related to various subject areas		
b.	Discussing books		
	 Discuss messages and themes from books in all subject areas. 		
	 Respond to a variety of texts in multiple modes of discourse. 		
	 Relate messages and themes from one subject area to messages and themes in another area. 		
	• Evaluate the merit of texts in every subject discipline.		
	 Examine author's purpose in writing. 		
	 Recognize the features of disciplinary texts. 		

GEORGIA Mathematics 1 Performance Standards		EXPLORE Mathematics College Readiness Standards
C.	Building vocabulary knowledge	
	 Demonstrate an understanding of contextual vocabulary in various subjects. 	
	 Use content vocabulary in writing and speaking. 	
	• Explore understanding of new words found in subject area texts.	
d.	Establishing context	
	 Explore life experiences related to subject area content. 	
	 Discuss in both writing and speaking how certain words are subject area related. 	
	 Determine strategies for finding content and contextual meaning for unknown words. 	



GEORGIA Mathematics 1 Performance Standards

PLAN Mathematics College Readiness Standards

AL	GEBRA		
Students will explore functions and solve simple equations. Students will simplify and operate with radical, polynomial, and rational expressions.			
MN cha sim	MM1A1. Students will explore and interpret the characteristics of functions, using graphs, tables, and simple algebraic techniques.		
a.	Represent functions using function notation.		
b.	Graph the basic functions $f(x) = x^n$, where $n = 1$ to 3, $f(x) = \sqrt{x}$, $f(x) = x $, and $f(x) = \frac{1}{x}$.		
C.	Graph transformations of basic functions including vertical shifts, stretches, and shrinks, as well as reflections across the <i>x</i> - and <i>y</i> -axes.		
d.	Investigate and explain the characteristics of a function: domain, range, zeros, intercepts, intervals of increase and decrease, maximum and minimum values, and end behavior.		
e.	Relate to a given context the characteristics of a function, and use graphs and tables to investigate its behavior.		
f.	Recognize sequences as functions with domains that are whole numbers.		
g.	Explore rates of change, comparing constant rates of	Graphical Representations:	
	change (i.e., slope) versus variable rates of change. Compare rates of change of linear guadratic square	Exhibit knowledge of slope	
	root, and other function families.	Determine the slope of a line from points or equations	
h.	Determine graphically and algebraically whether a function has symmetry and whether it is even, odd, or neither.		
i.	Understand that any equation in x can be interpreted as	Expressions, Equations, & Inequalities:	
	the equation $f(x) = g(x)$, and interpret the solutions of the equation as the x-value(s) of the intersection	Find solutions to systems of linear equations	
	point(s) of the graphs of $y = f(x)$ and $y = g(x)$.		
MN <mark>exp</mark>	11A2. Students will simplify and operate with radical pressions, polynomials, and rational expressions.		
a.	Simplify algebraic and numeric expressions involving	Numbers: Concepts & Properties:	
	square root.	Work with squares and square roots of numbers	
		Expressions, Equations, & Inequalities:	
		Manipulate expressions and equations	
b.	Perform operations with square roots.	Expressions, Equations, & Inequalities:	
		Manipulate expressions and equations	
C.	Add, subtract, multiply, and divide polynomials.	Expressions, Equations, & Inequalities:	
		Complete like terms (e.g., $2x + 5x$)	
		Aud and subtract simple algebraic expressions	
		Add subtract and multiply polynomials	
d.	Expand binomials using the Binomial Theorem.		

GE Pe	ORGIA Mathematics 1 rformance Standards	PLAN Mathematics College Readiness Standards
e.	Add, subtract, multiply, and divide rational expressions.	Expressions, Equations, & Inequalities:
		Manipulate expressions and equations
f.	Factor expressions by greatest common factor,	Expressions, Equations, & Inequalities:
	grouping, trial and error, and special products limited to the formulas below. $(x + y)^2 = x^2 + 2xy + y^2$ $(x - y)^2 = x^2 - 2xy + y^2$	Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)
	$(x + y)(x - y) = x^{2} - y^{2}$ $(x + a)(x + b) = x^{2} + (a + b)x + ab$ $(x + y)^{3} = x^{3} + 3x^{2}y + 3xy^{2} + y^{3}$ $(x - y)^{3} = x^{3} - 3x^{2}y + 3xy^{2} - y^{3}$	
g.	Use area and volume models for polynomial arithmetic.	Expressions, Equations, & Inequalities:
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
MN	11A3. Students will solve simple equations.	
a.	Solve quadratic equations in the form $ax^2 + bx + c = 0$,	Expressions, Equations, & Inequalities:
	where <i>a</i> = 1, by using factorization and finding square roots where applicable.	Solve quadratic equations
b.	Solve equations involving radicals such as $\sqrt{x} + b = c$, using algebraic techniques.	
C.	Use a variety of techniques, including technology,	Probability, Statistics, & Data Analysis:
	tables, and graphs to solve equations resulting from the investigation of $x^2 + bx + c = 0$.	Interpret and use information from figures, tables, and graphs
d.	Solve simple rational equations that result in linear	Expressions, Equations, & Inequalities:
	coefficient of 1.	Manipulate expressions and equations
GEOMETRY		
Students will explore, understand, and use the formal language of reasoning and justification. Students will apply properties of polygons and determine distances and points of concurrence.		
MN figu	11G1. <mark>Students will investigate properties of geometric ires in the coordinate plane.</mark>	
a.	Determine the distance between two points.	Graphical Representations:
		Use the distance formula
b.	Determine the distance between a point and a line.	Graphical Representations:
		Use the distance formula
C.	Determine the midpoint of a segment.	Graphical Representations:
<u> </u>		Find the midpoint of a line segment
d.	Understand the distance formula as an application of the Pythagorean theorem.	Properties of Plane Figures: Use the Pythagorean theorem
e.	Use the coordinate plane to investigate properties of and verify conjectures related to triangles and quadrilaterals.	

GE Pe	ORGIA Mathematics 1 rformance Standards	PLAN Mathematics College Readiness Standards	
MN ma	MM1G2. Students will understand and use the language of mathematical argument and justification.		
a.	Use conjecture, inductive reasoning, deductive reasoning, counterexamples, and indirect proof as appropriate.		
b.	Understand and use the relationships among a statement and its converse, inverse, and contrapositive.		
MN of t	11G3. Students will discover, prove, and apply properties riangles, quadrilaterals, and other polygons.		
a.	Determine the sum of interior and exterior angles in a	Properties of Plane Figures:	
	polygon.	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)	
		Use several angle properties to find an unknown angle measure	
		Use properties of isosceles triangles	
b.	Understand and use the triangle inequality, the side- angle inequality, and the exterior-angle inequality.		
C.	Understand and use congruence postulates and	Properties of Plane Figures:	
	theorems for triangles (SSS, SAS, ASA, AAS, HL).	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles	
d.	Understand, use, and prove properties of and	Properties of Plane Figures:	
	relationships among special quadrilaterals: parallelogram, rectangle, rhombus, square, trapezoid, and kite.	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g. 90° 180° and 360°)	
an		Use several angle properties to find an unknown angle measure	
e.	Find and use points of concurrency in triangles: incenter, orthocenter, circumcenter, and centroid.		
DA	ATA ANALYSIS AND PROBABILITY		
Stu pro dat col inv	Students will use counting techniques and determine probability. Students will demonstrate understanding of data analysis by posing questions to be answered by collecting data. Students will organize, represent, investigate, interpret, and make inferences from data.		
MN rela	11D1. Students will determine the number of outcomes ated to a given event.		
a.	Apply the addition and multiplication principles of	Probability, Statistics, & Data Analysis:	
	counting.	Exhibit knowledge of simple counting techniques	
		Use Venn diagrams in counting	
		Apply counting techniques	
b.	Calculate and use simple permutations and combinations.		
MN	11D2. Students will use the basic laws of probability.		
a.	Find the probabilities of mutually exclusive events.	Probability, Statistics, & Data Analysis:	
		Determine the probability of a simple event	
		Compute straightforward probabilities for common situations	

GEORGIA Mathematics 1 Performance Standards	PLAN Mathematics
	Brahakility Statiatics & Data Analysia
b. Find the probabilities of dependent events.	Compute straightforward probabilities for common situations
c. Calculate conditional probabilities.	
d. Use expected value to predict outcomes.	
MM1D3. Students will relate samples to a population.	
a. Compare summary statistics (mean, median, quartiles, and interquartile range) from one sample data distribution to another sample data distribution in describing center and variability of the data distributions.	Probability, Statistics, & Data Analysis: Interpret and use information from figures, tables, and graphs
b. Compare the averages of the summary statistics from a large number of samples to the corresponding population parameters.	
c. Understand that a random sample is used to improve the chance of selecting a representative sample.	
MM1D4. Students will explore variability of data by determining the mean absolute deviation (the average of the absolute values of the deviations).	
PROCESS STANDARDS	
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.	
MM1P1. Students will solve problems (using appropriate technology).	
a. Build new mathematical knowledge through problem solving.	
b. Solve problems that arise in mathematics and in other	Basic Operations & Applications:
contexts.	Perform one-operation computation with whole numbers and decimals
	Solve problems in one or two steps using whole numbers
	Perform common conversions (e.g., inches to feet or hours to minutes)
	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent
	Solve some routine two-step arithmetic problems
	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average
	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)
	Solve word problems containing several rates, proportions, or percentages
	Probability, Statistics, & Data Analysis:
	Calculate the average of a list of positive whole numbers

GEORGIA Mathematics 1	PLAN Mathematics
Performance Standards	College Readiness Standards
	Perform a single computation using information from a table or chart
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Read tables and graphs
	Perform computations on data from tables and graphs
	Use the relationship between the probability of an event and the probability of its complement
	Calculate the missing data value, given the average and all data values but one
	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Determine the probability of a simple event
	Exhibit knowledge of simple counting techniques
	Calculate the average, given the frequency counts of all the data values
	Manipulate data from tables and graphs
	Compute straightforward probabilities for common situations
	Use Venn diagrams in counting
	Calculate or use a weighted average
	Interpret and use information from figures, tables, and graphs
	Apply counting techniques
	Compute a probability when the event and/or sample space are not given or obvious
	Numbers: Concepts & Properties:
	Recognize equivalent fractions and fractions in lowest terms
	Recognize one-digit factors of a number
	Identify a digit's place value
	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	Find and use the least common multiple
	Order fractions
	Work with numerical factors
	Work with scientific notation
	Work with squares and square roots of numbers
	Work problems involving positive integer exponents
	Work with cubes and cube roots of numbers
	Determine when an expression is undefined
	Apply number properties involving prime factorization
	Apply number properties involving even/odd numbers and factors/multiples

GEORGIA Mathematics 1	PLAN Mathematics
Performance Standards	College Readiness Standards
	Apply number properties involving positive/negative numbers
	Apply rules of exponents
	Expressions, Equations, & Inequalities:
	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)
	Solve equations in the form $x + a = b$, where a and b are whole numbers or decimals
	Substitute whole numbers for unknown quantities to evaluate expressions
	Solve one-step equations having integer or decimal answers
	Combine like terms (e.g., $2x + 5x$)
	Evaluate algebraic expressions by substituting integers for unknown quantities
	Add and subtract simple algebraic expressions
	Solve routine first-degree equations
	Perform straightforward word-to-symbol translations
	Multiply two binomials
	Solve real-world problems using first-degree equations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Identify solutions to simple quadratic equations
	Add, subtract, and multiply polynomials
	Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)
	Solve first-degree inequalities that do not require reversing the inequality sign
	Manipulate expressions and equations
	Write expressions, equations, and inequalities for common algebra settings
	Solve linear inequalities that require reversing the inequality sign
	Solve absolute value equations
	Solve quadratic equations
	Find solutions to systems of linear equations
	Graphical Representations:
	Identify the location of a point with a positive coordinate on the number line
	Locate points on the number line and in the first quadrant
	Locate points in the coordinate plane
	Comprehend the concept of length on the number line
	Exhibit knowledge of slope
	Identify the graph of a linear inequality on the number line
	Determine the slope of a line from points or equations

GEORGIA Mathematics 1 Performance Standards	PLAN Mathematics College Readiness Standards
	Match linear graphs with their equations
	Find the midpoint of a line segment
	Interpret and use information from graphs in the coordinate plane
	Match number line graphs with solution sets of linear inequalities
	Use the distance formula
	Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point
	Properties of Plane Figures:
	Exhibit some knowledge of the angles associated with parallel lines
	Find the measure of an angle using properties of parallel lines
	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
	Use several angle properties to find an unknown angle measure
	Recognize Pythagorean triples
	Use properties of isosceles triangles
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
	Use the Pythagorean theorem
	Measurement:
	Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
	Compute the perimeter of polygons when all side lengths are given
	Compute the area of rectangles when whole number dimensions are given
	Compute the area and perimeter of triangles and rectangles in simple problems
	Use geometric formulas when all necessary information is given
	Compute the area of triangles and rectangles when one or more additional simple steps are required
	Compute the area and circumference of circles after identifying necessary information
	Compute the perimeter of simple composite geometric figures with unknown side lengths
	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure
 Apply and adapt a variety of appropriate strategies to solve problems. 	
 Monitor and reflect on the process of mathematical problem solving. 	

GE Pe	ORGIA Mathematics 1 rformance Standards	PLAN Mathematics College Readiness Standards
MM1P2. Students will reason and evaluate mathematical arguments.		
a.	Recognize reasoning and proof as fundamental aspects of mathematics.	
b.	Make and investigate mathematical conjectures.	
C.	Develop and <mark>evaluate mathematical arguments and proofs.</mark>	
d.	Select and use various types of reasoning and methods of proof.	
MN	11P3. Students will communicate mathematically.	
а.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
C.	Analyze and evaluate the mathematical thinking and strategies of others.	
d.	Use the language of mathematics to express mathematical ideas precisely.	Expressions, Equations, & Inequalities: Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
MM1P4. Students will make connections among mathematical ideas and to other disciplines.		
а.	Recognize and use connections among mathematical ideas.	
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	
C.	Recognize and apply mathematics in contexts outside of mathematics.	
MM1P5. Students will represent mathematics in multiple ways.		
a.	Create and use representations to organize, record,	Probability, Statistics, & Data Analysis:
	and communicate mathematical ideas.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
b.	Select, apply, and translate among mathematical	Probability, Statistics, & Data Analysis:
	representations to solve problems.	Interpret and use information from figures, tables, and graphs

GE Pe	ORGIA Mathematics 1 rformance Standards	PLAN Mathematics College Readiness Standards
C.	Use representations to model and interpret physical,	Probability, Statistics, & Data Analysis:
	social, and mathematical phenomena.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
		Manipulate data from tables and graphs
		Interpret and use information from figures, tables, and graphs
		Expressions, Equations, & Inequalities:
		Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
		Write expressions, equations, and inequalities for common algebra settings
M	ATH READING CONTENT	
Stu	dents will enhance reading in all curriculum areas by:	
a.	Reading in all curriculum areas	
	• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas	
	 Read both informational and fictional texts in a variety of genres and modes of discourse 	
	Read technical texts related to various subject areas	
b.	Discussing books	
	 Discuss messages and themes from books in all subject areas. 	
	 Respond to a variety of texts in multiple modes of discourse. 	
	 Relate messages and themes from one subject area to messages and themes in another area. 	
	• Evaluate the merit of texts in every subject discipline.	
	 Examine author's purpose in writing. 	
	Recognize the features of disciplinary texts.	
C.	Building vocabulary knowledge	
	 Demonstrate an understanding of contextual vocabulary in various subjects. 	
	 Use content vocabulary in writing and speaking. 	
	• Explore understanding of new words found in subject area texts.	
d.	Establishing context	
	 Explore life experiences related to subject area content. 	
	 Discuss in both writing and speaking how certain words are subject area related. 	
	 Determine strategies for finding content and contextual meaning for unknown words. 	

GEORGIA Mathematics 2 Performance Standards

PLAN Mathematics College Readiness Standards

NUMBER AND OPERATIONS		
Students will use the complex number system.		
MM2N1. Students will represent and operate with con numbers.	nplex	
a. Write square roots of negative numbers in imagin form.	ary	
b. Write complex numbers in the form $a + bi$.		
c. Add, subtract, multiply, and divide complex number	ers.	
d. Simplify expressions involving complex numbers.		
ALGEBRA		
Students will investigate piecewise, exponential, and quadratic functions, using numerical, analytical, and graphical approaches, focusing on the use of these functions in problem-solving situations. Students will solve equations and inequalities and explore inverses of functions.		
MM2A1. Students will investigate step and piecewise functions, including greatest integer and absolute valu functions.	l <mark>e</mark>	
a. Write absolute value functions as piecewise funct	ions.	
b. Investigate and explain characteristics of a variety piecewise functions including domain, range, vert axis of symmetry, zeros, intercepts, extrema, poir discontinuity, intervals over which the function is constant, intervals of increase and decrease, and of change.	rates	
 Solve absolute value equations and inequalities analytically, graphically, and by using appropriate technology. 	Expressions, Equations, & Inequalities: Solve absolute value equations	
MM2A2. Students will explore exponential functions.		
a. Extend properties of exponents to include all integeneration exponents.	Jer Numbers: Concepts & Properties: Apply rules of exponents	
 Investigate and explain characteristics of exponer functions, including domain and range, asymptote zeros, intercepts, intervals of increase and decrea rates of change, and end behavior. 	ntial es, ise,	
c. Graph functions as transformations of $f(x) = a^x$.		
d. Solve simple exponential equations and inequaliti analytically, graphically, and by using appropriate technology.	es	
e. Understand and use basic exponential functions a models of real phenomena.	as	
f. Understand and recognize geometric sequences exponential functions with domains that are whole numbers.	as e	
g. Interpret the constant ratio in a geometric sequent the base of the associated exponential function.	ce as	

GEORGIA Mathematics 2	PLAN Mathematics	
Performance Standards	College Readiness Standards	
MM2A3. Students will analyze quadratic functions in the forms $f(x) = ax^2 + bx + c$		
and $f(x) = a(x-h)^2 + k$.		
a. Convert between standard and vertex form.		
b. Graph quadratic functions as transformations of the function $f(x) = x^2$.		
 Investigate and explain characteristics of quadratic functions, including domain, range, vertex, axis of symmetry, zeros, intercepts, extrema, intervals of increase and decrease, and rates of change. 		
 Explore arithmetic series and various ways of computing their sums. 		
e. Explore sequences of partial sums of arithmetic series as examples of quadratic functions.		
MM2A4. Students will solve quadratic equations and inequalities in one variable.		
a. Solve equations graphically using appropriate	Graphical Representations:	
technology.	Interpret and use information from graphs in the coordinate plane	
 Find real and complex solutions of equations by factoring, taking square roots, and applying the quadratic formula. 	Expressions, Equations, & Inequalities: Solve quadratic equations	
c. Analyze the nature of roots using technology and using the discriminant.		
d. Solve quadratic inequalities both graphically and algebraically, and describe the solutions using linear inequalities.		
MM2A5. Students will explore inverses of functions.		
 Discuss the characteristics of functions and their inverses, including one-to-oneness, domain, and range 		
b. Determine inverses of linear, quadratic, and power		
functions and functions of the form $f(x) = \frac{a}{x}$, including		
the use of restricted domains.		
c. Explore the graphs of functions and their inverses.		
d. Use composition to verify that functions are inverses of each other.		
GEOMETRY		
Students will explore right triangles and right-triangle trigonometry. They will understand and apply properties of circles and spheres, and use them in determining related measures.		
MM2G1. Students will identify and use special right triangles.		
a. Determine the lengths of sides of 30°-60°-90° triangles	Properties of Plane Figures:	
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles	

GE Pe	ORGIA Mathematics 2 rformance Standards	PLAN Mathematics College Readiness Standards
b.	Determine the lengths of sides of 45°-45°-90° triangles.	Properties of Plane Figures:
		Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
MN tan	12G2. Students will define and apply sine, cosine, and gent ratios to right triangles.	
а.	Discover the relationship of the trigonometric ratios for similar triangles.	
b.	Explain the relationship between the trigonometric ratios of complementary angles.	
C.	Solve application problems using the trigonometric ratios.	
MN	I2G3. Students will understand the properties of circles.	
a.	Understand and use properties of chords, tangents,	Properties of Plane Figures:
	and secants as an application of triangle similarity.	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
b.	Understand and use properties of central, inscribed, and related angles.	
C.	Use the properties of circles to solve problems involving	Measurement:
	the length of an arc and the area of a sector.	Compute the area and circumference of circles after identifying necessary information
d.	Justify measurements and relationships in circles using geometric and algebraic properties.	
MM2G4. Students will find and compare the measures of spheres.		
a.	Use and apply surface area and volume of a sphere.	
b.	Determine the effect on surface area and volume of changing the radius or diameter of a sphere.	
DA	TA ANALYSIS AND PROBABILITY	
Students will demonstrate understanding of data analysis by posing questions to be answered by collecting data. Students will organize, represent, investigate, interpret, and make inferences from data. They will use regression to analyze data and to make inferences.		
MN infe dev	I2D1. Using sample data, students will make informal erences about population means and standard riations.	
a.	Pose a question and collect sample data from at least two different populations.	
b.	Understand and calculate the means and standard	Probability, Statistics, & Data Analysis:
	deviations <mark>of sets of data.</mark>	Calculate the average of a list of positive whole numbers
		Calculate the average of a list of numbers
		Calculate the average, given the number of data values and the sum of the data values
		Perform computations on data from tables and graphs
		Calculate the average, given the frequency counts of all the data values

GEORGIA Mathematics 2 Performance Standards	PLAN Mathematics College Readiness Standards
 Use means and standard deviations to compare data sets. 	
d. Compare the means and standard deviations of random samples with the corresponding population parameters, including those population parameters for normal distributions. Observe that the different sample means vary from one sample to the next. Observe that the distribution of the sample means has less variability than the population distribution.	
MM2D2. Students will determine an algebraic model to quantify the association between two quantitative variables.	
 Gather and plot data that can be modeled with linear and quadratic functions. 	 Probability, Statistics, & Data Analysis: Translate from one representation of data to another (e.g., a bar graph to a circle graph) Graphical Representations: Locate points in the coordinate plane
b. Examine the issues of curve fitting by finding good linear fits to data using simple methods median-median line and "eyeballing."	 Probability, Statistics, & Data Analysis: Perform computations on data from tables and graphs Interpret and use information from figures, tables, and graphs Graphical Representations: Interpret and use information from graphs in the coordinate plane
 Understand and apply the processes of linear and quadratic regression for curve fitting using appropriate technology. 	
d. Investigate issues that arise when using data to explore the relationship between two variables, including confusion between correlation and causation.	
PROCESS STANDARDS	
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.	
MM2P1. Students will solve problems (using appropriate technology).	
 Build new mathematical knowledge through problem solving. 	
b. Solve problems that arise in mathematics and in other	Basic Operations & Applications:
<u>contexts.</u>	Perform one-operation computation with whole numbers and decimals Solve problems in one or two steps using whole numbers Perform common conversions (e.g., inches to feet or hours to minutes) Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent Solve some routine two-step arithmetic problems

GEORGIA Mathematics 2 Performance Standards	PLAN Mathematics College Readiness Standards
	Solve routine two-step or three-step arithmetic problems
	involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average
	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)
	Solve word problems containing several rates, proportions, or percentages
	Probability, Statistics, & Data Analysis:
	Calculate the average of a list of positive whole numbers
	Perform a single computation using information from a table or chart
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Read tables and graphs
	Perform computations on data from tables and graphs
	Use the relationship between the probability of an event and the probability of its complement
	Calculate the missing data value, given the average and all data values but one
	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Determine the probability of a simple event
	Exhibit knowledge of simple counting techniques
	Calculate the average, given the frequency counts of all the data values
	Manipulate data from tables and graphs
	Compute straightforward probabilities for common situations
	Use Venn diagrams in counting
	Calculate or use a weighted average
	Interpret and use information from figures, tables, and graphs
	Apply counting techniques
	Compute a probability when the event and/or sample space are not given or obvious
	Numbers: Concepts & Properties:
	Recognize equivalent fractions and fractions in lowest terms
	Recognize one-digit factors of a number
	Identify a digit's place value
	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	Find and use the least common multiple
	Order fractions

GEORGIA Mathematics 2	PLAN Mathematics
Performance Standards	College Readiness Standards
	Work with numerical factors
	Work with scientific notation
	Work with squares and square roots of numbers
	Work problems involving positive integer exponents
	Work with cubes and cube roots of numbers
	Determine when an expression is undefined
	Apply number properties involving prime factorization
	Apply number properties involving even/odd numbers and factors/multiples
	Apply number properties involving positive/negative numbers
	Apply rules of exponents
	Expressions, Equations, & Inequalities:
	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)
	Solve equations in the form $x + a = b$, where <i>a</i> and <i>b</i> are whole numbers or decimals
	Substitute whole numbers for unknown quantities to evaluate expressions
	Solve one-step equations having integer or decimal answers
	Combine like terms (e.g., $2x + 5x$)
	Evaluate algebraic expressions by substituting integers for unknown quantities
	Add and subtract simple algebraic expressions
	Solve routine first-degree equations
	Perform straightforward word-to-symbol translations
	Multiply two binomials
	Solve real-world problems using first-degree equations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Identify solutions to simple quadratic equations
	Add, subtract, and multiply polynomials
	Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)
	Solve first-degree inequalities that do not require reversing the inequality sign
	Manipulate expressions and equations
	Write expressions, equations, and inequalities for common algebra settings
	Solve linear inequalities that require reversing the inequality sign
	Solve absolute value equations
	Solve quadratic equations
	Find solutions to systems of linear equations
TABLE D

GEORGIA Mathematics 2 Performance Standards	PLAN Mathematics College Readiness Standards
	Graphical Representations:
	Identify the location of a point with a positive coordinate on the number line
	Locate points on the number line and in the first quadrant
	Locate points in the coordinate plane
	Comprehend the concept of length on the number line
	Exhibit knowledge of slope
	Identify the graph of a linear inequality on the number line
	Determine the slope of a line from points or equations
	Match linear graphs with their equations
	Find the midpoint of a line segment
	Interpret and use information from graphs in the coordinate plane
	Match number line graphs with solution sets of linear inequalities
	Use the distance formula
	Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point
	Properties of Plane Figures:
	Exhibit some knowledge of the angles associated with parallel lines
	Find the measure of an angle using properties of parallel lines
	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
	Use several angle properties to find an unknown angle measure
	Recognize Pythagorean triples
	Use properties of isosceles triangles
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
	Use the Pythagorean theorem
	Measurement:
	Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
	Compute the perimeter of polygons when all side lengths are given
	Compute the area of rectangles when whole number dimensions are given
	Compute the area and perimeter of triangles and rectangles in simple problems
	Use geometric formulas when all necessary information is given
	Compute the area of triangles and rectangles when one or more additional simple steps are required
	Compute the area and circumference of circles after identifying necessary information

TABLE D

GE Pe	ORGIA Mathematics 2 rformance Standards	PLAN Mathematics College Readiness Standards
		Compute the perimeter of simple composite geometric figures with unknown side lengths
		Use relationships involving area, perimeter, and volume of geometric figures to compute another measure
C.	Apply and adapt a variety of appropriate strategies to solve problems.	
d.	Monitor and reflect on the process of mathematical problem solving.	
MN arg	12P2. Students will reason and evaluate mathematical uments.	
a.	Recognize reasoning and proof as fundamental aspects of mathematics.	
b.	Make and investigate mathematical conjectures.	
C.	Develop and <mark>evaluate mathematical arguments and proofs.</mark>	
d.	Select and use various types of reasoning and methods of proof.	
MN	12P3. Students will communicate mathematically.	
a.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
C.	Analyze and evaluate the mathematical thinking and strategies of others.	
d.	Use the language of mathematics to express	Expressions, Equations, & Inequalities:
	mathematical ideas precisely.	Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
MM2P4. Students will make connections among mathematical ideas and to other disciplines.		
a.	Recognize and use connections among mathematical ideas.	
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	
C.	Recognize and apply mathematics in contexts outside of mathematics.	
MN <mark>wa</mark>	12P5. Students will represent mathematics in multiple ys.	
a.	Create and use representations to organize, record,	Probability, Statistics, & Data Analysis:
	and communicate mathematical ideas.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
b.	Select, apply, and translate among mathematical	Probability, Statistics, & Data Analysis:
	representations to solve problems.	Interpret and use information from figures, tables, and graphs

TABLE D

GEORGIA Mathematics 2 Performance Standards	PLAN Mathematics College Readiness Standards
c. Use representations to model and interpret physical,	Probability, Statistics, & Data Analysis:
social, and mathematical phenomena.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Manipulate data from tables and graphs
	Interpret and use information from figures, tables, and
	graphs
	Expressions, Equations, & inequalities.
	Write expressions equations or inequalities with a single
	variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Write expressions, equations, and inequalities for common algebra settings
MATH READING CONTENT	
Students will enhance reading in all curriculum areas by:	
a. Reading in all curriculum areas	
 Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas 	
 Read both informational and fictional texts in a variety of genres and modes of discourse 	
 Read technical texts related to various subject areas 	
b. Discussing books	
 Discuss messages and themes from books in all subject areas. 	
 Respond to a variety of texts in multiple modes of discourse. 	
 Relate messages and themes from one subject area to messages and themes in another area. 	
Evaluate the merit of texts in every subject discipline.	
 Examine author's purpose in writing. 	
 Recognize the features of disciplinary texts. 	
c. Building vocabulary knowledge	
 Demonstrate an understanding of contextual vocabulary in various subjects. 	
 Use content vocabulary in writing and speaking. 	
 Explore understanding of new words found in subject area texts. 	
d. Establishing context	
 Explore life experiences related to subject area content. 	
 Discuss in both writing and speaking how certain words are subject area related. 	
 Determine strategies for finding content and contextual meaning for unknown words. 	

GE Pe	ORGIA Mathematics 2 rformance Standards	ACT Mathematics College Readiness Standards
NUMBER AND OPERATIONS		
<mark>Stu</mark>	dents will use the complex number system.	
MN nur	12N1. Students will represent and operate with complex nbers.	
a.	Write square roots of negative numbers in imaginary	Numbers: Concepts & Properties:
	torm.	Exhibit some knowledge of the complex numbers
b.	Write complex numbers in the form <i>a</i> + <i>bi</i> .	Numbers: Concepts & Properties:
		Exhibit some knowledge of the complex numbers
C.	Add, subtract, multiply, and divide complex numbers.	Numbers: Concepts & Properties:
		Exhibit some knowledge of the complex numbers
		Multiply two complex numbers
4	Cimplify everygoing involving complex numbers	Apply properties of complex numbers
u.	Simplify expressions involving complex numbers.	Exhibit some knowledge of the complex numbers
		Multiply two complex numbers
		Apply properties of complex numbers
ΔΙ	GERDA	
quadratic functions, using numerical, analytical, and graphical approaches, focusing on the use of these functions in problem-solving situations. Students will solve equations and inequalities and explore inverses of functions.		
MM2A1. Students will investigate step and piecewise functions, including greatest integer and absolute value functions.		
а.	Write absolute value functions as piecewise functions.	Expressions, Equations, & Inequalities:
		Write expressions, equations, and inequalities for common algebra settings
b.	Investigate and explain characteristics of a variety of	Graphical Representations:
	piecewise functions including domain, range, vertex, axis of symmetry, zeros, intercepts, extrema, points of discontinuity, intervals over which the function is constant, intervals of increase and decrease, and rates of change.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
C.	Solve absolute value equations and inequalities	Expressions, Equations, & Inequalities:
	analytically, graphically, and by using appropriate technology.	Solve absolute value equations Solve simple absolute value inequalities
MN	12A2. Students will explore exponential functions.	
a.	Extend properties of exponents to include all integer	Numbers: Concepts & Properties:
	exponents.	Apply rules of exponents
b.	Investigate and explain characteristics of exponential	Graphical Representations:
	functions, including domain and range, asymptotes, zeros, intercepts, intervals of increase and decrease, rates of change, and end behavior.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$

GE Pe	EORGIA Mathematics 2 rformance Standards	ACT Mathematics College Readiness Standards
C.	Graph functions as transformations of $f(x) = a^{x}$.	Graphical Representations:
		Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
d.	Solve simple exponential equations and inequalities analytically, graphically, and by using appropriate technology.	
e.	Understand and use basic exponential functions as	Expressions, Equations, & Inequalities:
	models of real phenomena.	Write expressions that require planning and/or manipulating to accurately model a situation
f.	Understand and recognize geometric sequences as	Numbers: Concepts & Properties:
	numbers.	Exhibit knowledge of logarithms and geometric sequences
g.	Interpret the constant ratio in a geometric sequence as	Numbers: Concepts & Properties:
		Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
MM2A3. Students will analyze quadratic functions in the forms $f(x) = ax^2 + bx + c$ and $f(x) = a(x - h)^2 + k$.		
a.	Convert between standard and vertex form.	Expressions, Equations, & Inequalities:
		Manipulate expressions and equations
b.	Graph quadratic functions as transformations of the	Graphical Representations:
	function $f(x) = x^2$.	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)
		Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
C.	Investigate and explain characteristics of quadratic	Graphical Representations:
	functions, including domain, range, vertex, axis of symmetry, zeros, intercepts, extrema, intervals of increase and decrease, and rates of change.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
d.	Explore arithmetic series and various ways of computing their sums.	
e.	Explore sequences of partial sums of arithmetic series as examples of quadratic functions.	
MN ine	I2A4. Students will solve quadratic equations and qualities in one variable.	
a.	Solve equations graphically using appropriate	Graphical Representations:
	technology.	Interpret and use information from graphs in the coordinate plane
b.	Find real and complex solutions of equations by	Expressions, Equations, & Inequalities:
	factoring, taking square roots, and applying the quadratic formula.	Solve quadratic equations
C.	Analyze the nature of roots using technology and using the discriminant.	
d.	Solve quadratic inequalities both graphically and	Graphical Representations:
	algebraically, and describe the solutions using linear inequalities.	Match number line graphs with solution sets of simple quadratic inequalities

GE0 Per	ORGIA Mathematics 2 formance Standards	ACT Mathematics College Readiness Standards
MM2	2A5. Students will explore inverses of functions.	
a.	Discuss the characteristics of functions and their inverses, including one-to-oneness, domain, and range.	
b.	Determine inverses of linear, quadratic, and power	Expressions, Equations, & Inequalities:
I	functions and functions of the form $f(x) = \frac{a}{x}$, including	Manipulate expressions and equations
	the use of restricted domains.	
C.	Explore the graphs of functions and their inverses.	
d.	Use composition to verify that functions are inverses of	Functions:
		Write an expression for the composite of two simple functions
GE	OMETRY	
Students will explore right triangles and right-triangle trigonometry. They will understand and apply properties of circles and spheres, and use them in determining related measures.		
MM2 trian	2G1. Students will identify and use special right gles.	
а.	Determine the lengths of sides of 30°-60°-90° triangles.	Properties of Plane Figures:
		Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
b.	Determine the lengths of sides of 45°-45°-90° triangles.	Properties of Plane Figures:
		Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
MM2G2. Students will define and apply sine, cosine, and tangent ratios to right triangles.		
а.	Discover the relationship of the trigonometric ratios for	Properties of Plane Figures:
	similar triangles.	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
		Functions:
		Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
b.	Explain the relationship between the trigonometric	Functions:
ļ	ratios of complementary angles.	Use trigonometric concepts and basic identities to solve problems
С.	Solve application problems using the trigonometric	Functions:
	ratios.	Apply basic trigonometric ratios to solve right-triangle problems
MM	2G3. Students will understand the properties of circles.	
а.	Understand and use properties of chords, tangents,	Properties of Plane Figures:
	and secants as an application of thangle similarity.	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and
		Use relationships among angles, arcs, and distances in a
		circle
b.	Understand and use properties of central, inscribed,	Properties of Plane Figures:
	and related angles.	circle

GE Pe	ORGIA Mathematics 2 rformance Standards	ACT Mathematics College Readiness Standards
C.	Use the properties of circles to solve problems involving	Properties of Plane Figures:
	the length of an arc and the area of a sector.	Use relationships among angles, arcs, and distances in a circle
		Measurement:
		Compute the area and circumference of circles after identifying necessary information
d.	Justify measurements and relationships in circles using	Properties of Plane Figures:
	geometric and algebraic properties.	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
MN sph	I2G4. Students will find and compare the measures of leres.	
a.	Use and apply surface area and volume of a sphere.	Measurement:
		Use geometric formulas when all necessary information is given
b.	Determine the effect on surface area and volume of	Properties of Plane Figures:
	changing the radius or diameter of a sphere.	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
DA	TA ANALYSIS AND PROBABILITY	
Stu by Stu ma ana	dents will demonstrate understanding of data analysis posing questions to be answered by collecting data. dents will organize, represent, investigate, interpret, and ke inferences from data. They will use regression to alyze data and to make inferences.	
MN infe dev	I2D1. Using sample data, students will make informal erences about population means and standard riations.	
а.	Pose a question and collect sample data from at least two different populations.	
b.	Understand and calculate the means and standard	Probability, Statistics, & Data Analysis:
	deviations of sets of data.	Calculate the average of a list of positive whole numbers
		Calculate the average of a list of numbers
		Calculate the average, given the number of data values and the sum of the data values
		Perform computations on data from tables and graphs
		Calculate the average, given the frequency counts of all the data values
C.	Use means and standard deviations to compare data	Probability, Statistics, & Data Analysis:
	Sets.	Analyze and draw conclusions based on information from figures, tables, and graphs
d.	Compare the means and standard deviations of	Probability, Statistics, & Data Analysis:
	parameters, including those population parameters for normal distributions. Observe that the different sample means vary from one sample to the next. Observe that the distribution of the sample means has less variability than the population distribution.	Analyze and draw conclusions based on information from figures, tables, and graphs

GE Pe	ORGIA Mathematics 2 rformance Standards	ACT Mathematics College Readiness Standards
MN qua	12D2. Students will determine an algebraic model to antify the association between two quantitative variables.	
а.	Gather and plot data that can be modeled with linear	Probability, Statistics, & Data Analysis:
	and quadratic functions.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
		Graphical Representations:
		Locate points in the coordinate plane
b.	Examine the issues of curve fitting by finding good	Probability, Statistics, & Data Analysis:
	Inear fits to data using simple methods such as the median-median line and "eveballing."	Perform computations on data from tables and graphs
	modan modan me ana 'eyebannig.	Interpret and use information from figures, tables, and graphs
		Expressions, Equations, & Inequalities:
		Write expressions that require planning and/or manipulating to accurately model a situation
		Graphical Representations:
		Interpret and use information from graphs in the coordinate plane
C.	Understand and apply the processes of linear and quadratic regression for curve fitting using appropriate technology.	
d.	Investigate issues that arise when using data to explore	Probability, Statistics, & Data Analysis:
	the relationship between two variables, including confusion between correlation and causation.	Analyze and draw conclusions based on information from figures, tables, and graphs
PR	OCESS STANDARDS	
The eac em pro	e following process standards are essential to mastering ch of the mathematics content standards. They phasize critical dimensions of the mathematical ficiency that all students need.	
MN tec	12P1. Students will solve problems (using appropriate hnology).	
a.	Build new mathematical knowledge through problem solving.	
b.	Solve problems that arise in mathematics and in other	Basic Operations & Applications:
	contexts.	Perform one-operation computation with whole numbers and decimals
		Solve problems in one or two steps using whole numbers
		Perform common conversions (e.g., inches to feet or hours to minutes)
		Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent
		Solve some routine two-step arithmetic problems
		Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average
		Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)

GEORGIA Mathematics 2 Performance Standards	ACT Mathematics College Readiness Standards
	Solve word problems containing several rates, proportions, or percentages
	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)
	Probability, Statistics, & Data Analysis:
	Calculate the average of a list of positive whole numbers
	Perform a single computation using information from a table or chart
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Read tables and graphs
	Perform computations on data from tables and graphs
	Use the relationship between the probability of an event and the probability of its complement
	Calculate the missing data value, given the average and all data values but one
	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Determine the probability of a simple event
	Exhibit knowledge of simple counting techniques
	Calculate the average, given the frequency counts of all the data values
	Manipulate data from tables and graphs
	Compute straightforward probabilities for common situations
	Use Venn diagrams in counting
	Calculate or use a weighted average
	Interpret and use information from figures, tables, and graphs
	Apply counting techniques
	Compute a probability when the event and/or sample space are not given or obvious
	Distinguish between mean, median, and mode for a list of numbers
	Analyze and draw conclusions based on information from figures, tables, and graphs
	Exhibit knowledge of conditional and joint probability
	Numbers: Concepts & Properties:
	Recognize equivalent fractions and fractions in lowest terms
	Recognize one-digit factors of a number
	Identify a digit's place value

GEORGIA Mathematics 2	ACT Mathematics
Performance Standards	College Readiness Standards
	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	Find and use the least common multiple
	Order fractions
	Work with numerical factors
	Work with scientific notation
	Work with squares and square roots of numbers
	Work problems involving positive integer exponents
	Work with cubes and cube roots of numbers
	Determine when an expression is undefined
	Exhibit some knowledge of the complex numbers
	Apply number properties involving prime factorization
	Apply number properties involving even/odd numbers and factors/multiples
	Apply number properties involving positive/negative numbers
	Apply rules of exponents
	Multiply two complex numbers
	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
	Exhibit knowledge of logarithms and geometric sequences
	Apply properties of complex numbers
	Expressions, Equations, & Inequalities:
	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)
	Solve equations in the form $x + a = b$, where <i>a</i> and <i>b</i> are whole numbers or decimals
	Substitute whole numbers for unknown quantities to evaluate expressions
	Solve one-step equations having integer or decimal answers
	Combine like terms (e.g., $2x + 5x$)
	Evaluate algebraic expressions by substituting integers for unknown quantities
	Add and subtract simple algebraic expressions
	Solve routine first-degree equations
	Perform straightforward word-to-symbol translations
	Multiply two binomials
	Solve real-world problems using first-degree equations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Identify solutions to simple quadratic equations

GEORGIA Mathematics 2 Performance Standards	ACT Mathematics College Readiness Standards
	Add, subtract, and multiply polynomials
	Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)
	Solve first-degree inequalities that do not require reversing the inequality sign
	Manipulate expressions and equations
	Write expressions, equations, and inequalities for common algebra settings
	Solve linear inequalities that require reversing the inequality sign
	Solve absolute value equations
	Solve quadratic equations
	Find solutions to systems of linear equations
	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Solve simple absolute value inequalities
	Graphical Representations:
	Identify the location of a point with a positive coordinate on the number line
	Locate points on the number line and in the first quadrant
	Locate points in the coordinate plane
	Comprehend the concept of length on the number line
	Exhibit knowledge of slope
	Identify the graph of a linear inequality on the number line
	Determine the slope of a line from points or equations
	Match linear graphs with their equations
	Find the midpoint of a line segment
	plane
	Match number line graphs with solution sets of linear inequalities
	Use the distance formula
	Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point
	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)
	Match number line graphs with solution sets of simple quadratic inequalities
	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
	Solve problems integrating multiple algebraic and/or geometric concepts
	Analyze and draw conclusions based on information from graphs in the coordinate plane

GEORGIA Mathematics 2 Performance Standards	ACT Mathematics College Readiness Standards
	Properties of Plane Figures:
	Exhibit some knowledge of the angles associated with parallel lines
	Find the measure of an angle using properties of parallel lines
	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
	Use several angle properties to find an unknown angle measure
	Recognize Pythagorean triples
	Use properties of isosceles triangles
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
	Use the Pythagorean theorem
	Draw conclusions based on a set of conditions
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
	Use relationships among angles, arcs, and distances in a circle
	Measurement:
	Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
	Compute the perimeter of polygons when all side lengths are given
	Compute the area of rectangles when whole number dimensions are given
	Compute the area and perimeter of triangles and rectangles in simple problems
	Use geometric formulas when all necessary information is given
	Compute the area of triangles and rectangles when one or more additional simple steps are required
	Compute the area and circumference of circles after identifying necessary information
	Compute the perimeter of simple composite geometric figures with unknown side lengths
	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure
	Use scale factors to determine the magnitude of a size change
	Compute the area of composite geometric figures when planning or visualization is required
	Functions:
	Evaluate quadratic functions, expressed in function notation, at integer values
	Evaluate polynomial functions, expressed in function notation, at integer values

GEORGIA Mathematics 2	ACT Mathematics
Performance Standards	Conege Readiness Standards
	Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
	Evaluate composite functions at integer values
	Apply basic trigonometric ratios to solve right-triangle problems
	Write an expression for the composite of two simple functions
	Use trigonometric concepts and basic identities to solve problems
	Exhibit knowledge of unit circle trigonometry
	Match graphs of basic trigonometric functions with their equations
c. Apply and adapt a variety of appropriate strategies to	Expressions, Equations, & Inequalities:
solve problems.	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Graphical Representations:
	Solve problems integrating multiple algebraic and/or geometric concepts
	Properties of Plane Figures:
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
d. Monitor and reflect on the process of mathematical problem solving.	
MM2P2. Students will reason and evaluate mathematical	
arguments.	
a. Recognize reasoning and proof as fundamental aspects of mathematics.	
b. Make and investigate mathematical conjectures.	Probability, Statistics, & Data Analysis:
	Analyze and draw conclusions based on information from figures, tables, and graphs
	Numbers: Concepts & Properties:
	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
	Graphical Representations:
	Analyze and draw conclusions based on information from graphs in the coordinate plane Properties of Plane Figures:
	Draw conclusions based on a set of conditions

GE Pe	ORGIA Mathematics 2 rformance Standards	ACT Mathematics College Readiness Standards
C.	Develop and evaluate mathematical arguments and	Probability, Statistics, & Data Analysis:
	proofs.	Analyze and draw conclusions based on information from figures, tables, and graphs
		Numbers: Concepts & Properties:
		Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
		Graphical Representations:
		Analyze and draw conclusions based on information from graphs in the coordinate plane
		Properties of Figures.
d	Select and use various types of reasoning and methods	Numbers: Concents & Properties:
u.	of proof.	Draw conclusions based on number concents, algebraic
		properties, and/or relationships between expressions and numbers
		Properties of Plane Figures:
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
MM2P3. Students will communicate mathematically.		
a.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
C.	Analyze and evaluate the mathematical thinking and strategies of others.	
d.	Use the language of mathematics to express	Expressions, Equations, & Inequalities:
	mathematical ideas precisely.	Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
		Write expressions that require planning and/or manipulating to accurately model a situation
		Write equations and inequalities that require planning, manipulating, and/or solving
MN ma	MM2P4. Students will make connections among mathematical ideas and to other disciplines.	
a.	Recognize and use connections among mathematical	Properties of Plane Figures:
	ideas.	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	
C.	Recognize and apply mathematics in contexts outside of mathematics.	

GE Pe	EORGIA Mathematics 2 prformance Standards	ACT Mathematics College Readiness Standards
MN <mark>wa</mark>	MM2P5. Students will represent mathematics in multiple ways.	
а.	Create and use representations to organize, record,	Probability, Statistics, & Data Analysis:
	and communicate mathematical ideas.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
b.	Select, apply, and translate among mathematical	Basic Operations & Applications:
	representations to solve problems.	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)
		Probability, Statistics, & Data Analysis:
		Interpret and use information from figures, tables, and graphs
		Analyze and draw conclusions based on information from figures, tables, and graphs
		Expressions, Equations, & Inequalities:
	Write equations and inequalities that require planning, manipulating, and/or solving	
	Graphical Representations:	
	Solve problems integrating multiple algebraic and/or geometric concepts	
		Properties of Plane Figures:
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
C.	Use representations to model and interpret physical,	Probability, Statistics, & Data Analysis:
	social, and mathematical phenomena.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
		Manipulate data from tables and graphs
		Interpret and use information from figures, tables, and graphs
		Analyze and draw conclusions based on information from figures, tables, and graphs
		Expressions, Equations, & Inequalities:
		Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
		Write expressions, equations, and inequalities for common algebra settings
		Write expressions that require planning and/or manipulating to accurately model a situation
		Write equations and inequalities that require planning, manipulating, and/or solving
		Graphical Representations:
		Analyze and draw conclusions based on information from graphs in the coordinate plane

GEORGIA Mathematics 2 Performance Standards	ACT Mathematics College Readiness Standards
MATH READING CONTENT	
Students will enhance reading in all curriculum areas by:	
a. Reading in all curriculum areas	
 Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas 	
 Read both informational and fictional texts in a variety of genres and modes of discourse 	
 Read technical texts related to various subject areas 	
b. Discussing books	
 Discuss messages and themes from books in all subject areas. 	
 Respond to a variety of texts in multiple modes of discourse. 	
 Relate messages and themes from one subject area to messages and themes in another area. 	
 Evaluate the merit of texts in every subject discipline. 	
 Examine author's purpose in writing. 	
 Recognize the features of disciplinary texts. 	
c. Building vocabulary knowledge	
 Demonstrate an understanding of contextual vocabulary in various subjects. 	
 Use content vocabulary in writing and speaking. 	
 Explore understanding of new words found in subject area texts. 	
d. Establishing context	
 Explore life experiences related to subject area content. 	
 Discuss in both writing and speaking how certain words are subject area related. 	
 Determine strategies for finding content and contextual meaning for unknown words. 	

GEORGIA Mathematics 3 Performance Standards

ACT Mathematics College Readiness Standards

ALGEBRA		
Students will investigate exponential, logarithmic and		
polynomial functions of degree higher than 2. Students will understand matrices and use them to solve problems		
MM3A1 Students will analyze graphs of polynomial		
functions of higher degree.		
a. Graph simple polynomial functions as translations of	Graphical Representations:	
the function $f(x) = ax^n$.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
b. Understand the effects of the following on the graph of	Graphical Representations:	
a polynomial function: degree, lead coefficient, and multiplicity of real zeros.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
c. Determine whether a polynomial function has symmetry	Graphical Representations:	
and whether it is even, odd, or neither.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
d. Investigate and explain characteristics of polynomial	Graphical Representations:	
functions, including domain and range, intercepts, zeros, relative and absolute extrema, intervals of increase and decrease, and end behavior.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
MM3A2. Students will explore logarithmic functions as inverses of exponential functions.		
a. Define and understand the properties of <i>n</i> th roots.	Numbers: Concepts & Properties:	
	Work with squares and square roots of numbers	
	Work with cubes and cube roots of numbers	
	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers	
b. Extend properties of exponents to include rational	Numbers: Concepts & Properties:	
exponents.	Apply rules of exponents	
c. Define logarithmic functions as inverses of exponential	Numbers: Concepts & Properties:	
functions.	Exhibit knowledge of logarithms and geometric sequences	
d. Understand and use properties of logarithms by	Numbers: Concepts & Properties:	
extending laws of exponents.	Exhibit knowledge of logarithms and geometric sequences	
e. Investigate and explain characteristics of exponential	Numbers: Concepts & Properties:	
asymptotes, zeros, intercepts, intervals of increase and	Exhibit knowledge of logarithms and geometric sequences	
decrease, and rate of change.	Graphical Representations:	
	Identity characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
f. Graph functions as transformations of $f(x) = a^x$,	Graphical Representations:	
$r(x) = \log_a x, r(x) = e, r(x) = \ln x.$	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	

GE Pe	ORGIA Mathematics 3 rformance Standards	ACT Mathematics College Readiness Standards
g.	Explore real phenomena related to exponential and	Expressions, Equations, & Inequalities:
-	logarithmic functions including half-life and doubling time.	Write expressions that require planning and/or manipulating to accurately model a situation
		Write equations and inequalities that require planning, manipulating, and/or solving
		Graphical Representations:
		Solve problems integrating multiple algebraic and/or geometric concepts
MN ine	13A3. Students will solve a variety of equations and qualities.	
a.	Find real and complex roots of higher degree polynomial equations using the factor theorem, remainder theorem, rational root theorem, and fundamental theorem of algebra, incorporating complex	
	and radical conjugates.	
b.	Solve polynomial, exponential, and logarithmic	Numbers: Concepts & Properties:
	equations analytically, graphically, and using appropriate technology.	Exhibit knowledge of logarithms and geometric sequences
C.	Solve polynomial, exponential, and logarithmic	Numbers: Concepts & Properties:
	appropriate technology. Represent solution sets of inequalities using appropriate technology.	Exhibit knowledge of logarithms and geometric sequences
d.	Solve a variety of types of equations by appropriate	Expressions, Equations, & Inequalities:
	means choosing among mental calculation, pencil and paper, or appropriate technology.	Solve equations in the form $x + a = b$, where <i>a</i> and <i>b</i> are whole numbers or decimals
		Solve one-step equations having integer or decimal answers
		Solve routine first-degree equations
		Solve real-world problems using first-degree equations
		Solve absolute value equations
		Solve quadratic equations
MN <mark>ma</mark>	13A4. Students will perform basic operations with trices.	
a.	Add, subtract, multiply, and invert matrices, when possible, choosing appropriate methods, including technology.	
b.	Find the inverses of two-by-two matrices using pencil and paper, and find inverses of larger matrices using technology.	
C.	Examine the properties of matrices, contrasting them with properties of real numbers.	
MM3A5. Students will use matrices to formulate and solve problems.		
a.	Represent a system of linear equations as a matrix	
	equation.	
b.	Solve matrix equations using inverse matrices.	

GEORGIA Mathematics 3 Performance Standards	ACT Mathematics College Readiness Standards	
c. Represent and solve realistic problems using systems	Expressions, Equations, & Inequalities:	
of linear equations.	Find solutions to systems of linear equations	
	Write expressions that require planning and/or manipulating to accurately model a situation	
	Write equations and inequalities that require planning, manipulating, and/or solving	
MM3A6. Students will solve linear programming problems in two variables.		
a. Solve systems of inequalities in two variables, showing the solutions graphically.		
b. Represent and solve realistic problems using linear	Graphical Representations:	
programming.	Solve problems integrating multiple algebraic and/or geometric concepts	
MM3A7. Students will understand and apply matrix representations of vertex-edge graphs.		
a. Use graphs to represent realistic situations.		
b. Use matrices to represent graphs, and solve problems	Graphical Representations:	
that can be represented by graphs.	Solve problems integrating multiple algebraic and/or geometric concepts	
GEOMETRY		
Students will understand and use the analytic geometry of conic sections and of planes and spheres in space.		
MM3G1. Students will investigate the relationships between lines and circles.		
a. Find equations of circles.	Graphical Representations:	
	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)	
b. Graph a circle given an equation in general form.	Graphical Representations:	
	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
c. Find the equation of a tangent line to a circle at a given	Graphical Representations:	
point.	Solve problems integrating multiple algebraic and/or geometric concepts	
d. Solve a system of equations involving a circle and a	Graphical Representations:	
	Solve problems integrating multiple algebraic and/or geometric concepts	
e. Solve a system of equations involving two circles.	Graphical Representations:	
	Solve problems integrating multiple algebraic and/or geometric concepts	

GEORGIA Mathematics 3 Performance Standards	ACT Mathematics College Readiness Standards	
MM3G2. Students will recognize, analyze, and graph the	Graphical Representations:	
equations of the conic sections (parabolas, circles, ellipses, and hyperbolas).	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)	
	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
a. Convert equations of conics by completing the square.	Expressions, Equations, & Inequalities:	
	Manipulate expressions and equations	
	Graphical Representations:	
	Solve problems integrating multiple algebraic and/or geometric concepts	
b. Graph conic sections, identifying fundamental	Graphical Representations:	
	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
c. Write equations of conic sections given appropriate	Expressions, Equations, & Inequalities:	
information.	Write equations and inequalities that require planning, manipulating, and/or solving	
	Graphical Representations:	
	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)	
MM3G3. Students will investigate planes and spheres.		
a. Plot the point (<i>x</i> , <i>y</i> , <i>z</i>) and understand it as a vertex of a rectangular prism.		
b. Apply the distance formula in 3-space.	Graphical Representations:	
	Use the distance formula	
c. Recognize and understand equations of planes and spheres.		
DATA ANALYSIS AND PROBABILITY		
Students will use a normal distribution to calculate probabilities. They will organize, represent, investigate, interpret, and make inferences using data from both observational studies and experiments.		
MM3D1. Students will create probability histograms of	Probability, Statistics, & Data Analysis:	
discrete random variables, using both experimental and theoretical probabilities.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)	
MM3D2. Students will solve problems involving probabilities by interpreting a normal distribution as a probability histogram for a continuous random variable (<i>z</i> -scores are used for a general normal distribution).		
a. Determine intervals about the mean that include a	Probability, Statistics, & Data Analysis:	
given percent of data.	Analyze and draw conclusions based on information from figures, tables, and graphs	
b. Determine the probability that a given value falls within	Probability, Statistics, & Data Analysis:	
a specified interval.	Compute a probability when the event and/or sample space are not given or obvious	

GEORGIA Mathematics 3 Performance Standards	ACT Mathematics College Readiness Standards
c. Estimate how many items in a population fall within a	Probability, Statistics, & Data Analysis:
specified interval.	Interpret and use information from figures, tables, and graphs
MM3D3. Students will understand the differences between	Probability, Statistics, & Data Analysis:
experimental and observational studies by posing questions and collecting, analyzing, and interpreting data.	Analyze and draw conclusions based on information from figures, tables, and graphs
PROCESS STANDARDS	
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.	
MM3P1. Students will solve problems (using appropriate technology).	
a. Build new mathematical knowledge through problem solving.	
b. Solve problems that arise in mathematics and in other	Basic Operations & Applications:
contexts.	Perform one-operation computation with whole numbers and decimals
	Solve problems in one or two steps using whole numbers
	Perform common conversions (e.g., inches to feet or hours to minutes)
	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent
	Solve some routine two-step arithmetic problems
	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average
	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)
	Solve word problems containing several rates, proportions, or percentages
	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)
	Probability, Statistics, & Data Analysis:
	Calculate the average of a list of positive whole numbers
	Perform a single computation using information from a table or chart
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Read tables and graphs
	Perform computations on data from tables and graphs
	Use the relationship between the probability of an event and the probability of its complement

GEORGIA Mathematics 3 Performance Standards	ACT Mathematics College Readiness Standards
	Calculate the missing data value, given the average and all data values but one
	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Determine the probability of a simple event
	Exhibit knowledge of simple counting techniques
	Calculate the average, given the frequency counts of all the data values
	Manipulate data from tables and graphs
	Compute straightforward probabilities for common situations
	Use Venn diagrams in counting
	Calculate or use a weighted average
	Interpret and use information from figures, tables, and graphs
	Apply counting techniques
	Compute a probability when the event and/or sample space are not given or obvious
	Distinguish between mean, median, and mode for a list of numbers
	Analyze and draw conclusions based on information from figures, tables, and graphs
	Exhibit knowledge of conditional and joint probability
	Numbers: Concepts & Properties:
	Recognize equivalent fractions and fractions in lowest terms
	Recognize one-digit factors of a number
	Identify a digit's place value
	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	Find and use the least common multiple
	Order fractions
	Work with numerical factors
	Work with scientific notation
	Work with squares and square roots of numbers
	Work problems involving positive integer exponents
	Work with cubes and cube roots of numbers
	Determine when an expression is undefined
	Exhibit some knowledge of the complex numbers
	Apply number properties involving prime factorization
	Apply number properties involving even/odd numbers and factors/multiples
	Apply number properties involving positive/negative numbers
	Apply rules of exponents

GEORGIA Mathematics 3 Performance Standards	ACT Mathematics College Readiness Standards
	Multiply two complex numbers
	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
	Exhibit knowledge of logarithms and geometric sequences
	Apply properties of complex numbers
	Expressions, Equations, & Inequalities:
	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)
	Solve equations in the form $x + a = b$, where <i>a</i> and <i>b</i> are whole numbers or decimals
	Substitute whole numbers for unknown quantities to evaluate expressions
	Solve one-step equations having integer or decimal answers
	Combine like terms (e.g., $2x + 5x$)
	Evaluate algebraic expressions by substituting integers for unknown quantities
	Add and subtract simple algebraic expressions
	Solve routine first-degree equations
	Perform straightforward word-to-symbol translations
	Multiply two binomials
	Solve real-world problems using first-degree equations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Identify solutions to simple quadratic equations
	Add, subtract, and multiply polynomials
	Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)
	Solve first-degree inequalities that do not require reversing the inequality sign
	Manipulate expressions and equations
	Write expressions, equations, and inequalities for common algebra settings
	Solve linear inequalities that require reversing the inequality sign
	Solve absolute value equations
	Solve quadratic equations
	Find solutions to systems of linear equations
	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Solve simple absolute value inequalities

GEORGIA Mathematics 3 Performance Standards	ACT Mathematics College Readiness Standards
	Graphical Representations:
	Identify the location of a point with a positive coordinate on the number line
	Locate points on the number line and in the first quadrant
	Locate points in the coordinate plane
	Comprehend the concept of length on the number line
	Exhibit knowledge of slope
	Identify the graph of a linear inequality on the number line
	Determine the slope of a line from points or equations
	Match linear graphs with their equations
	Find the midpoint of a line segment
	Interpret and use information from graphs in the coordinate plane
	Match number line graphs with solution sets of linear inequalities
	Use the distance formula
	Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point
	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)
	Match number line graphs with solution sets of simple quadratic inequalities
	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
	Solve problems integrating multiple algebraic and/or geometric concepts
	Analyze and draw conclusions based on information from graphs in the coordinate plane
	Properties of Plane Figures:
	Exhibit some knowledge of the angles associated with parallel lines
	Find the measure of an angle using properties of parallel lines
	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
	Use several angle properties to find an unknown angle measure
	Recognize Pythagorean triples
	Use properties of isosceles triangles
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
	Use the Pythagorean theorem
	Draw conclusions based on a set of conditions
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas

GEORGIA Mathematics 3	ACT Mathematics
Performance Standards	College Readiness Standards
	Use relationships among angles, arcs, and distances in a circle
	Measurement:
	Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
	Compute the perimeter of polygons when all side lengths are given
	Compute the area of rectangles when whole number dimensions are given
	Compute the area and perimeter of triangles and rectangles in simple problems
	Use geometric formulas when all necessary information is given
	Compute the area of triangles and rectangles when one or more additional simple steps are required
	Compute the area and circumference of circles after identifying necessary information
	Compute the perimeter of simple composite geometric figures with unknown side lengths
	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure
	Use scale factors to determine the magnitude of a size change
	Compute the area of composite geometric figures when planning or visualization is required
	Functions:
	Evaluate quadratic functions, expressed in function notation, at integer values
	Evaluate polynomial functions, expressed in function notation, at integer values
	Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
	Evaluate composite functions at integer values
	Apply basic trigonometric ratios to solve right-triangle problems
	Write an expression for the composite of two simple functions
	Use trigonometric concepts and basic identities to solve problems
	Exhibit knowledge of unit circle trigonometry
	Match graphs of basic trigonometric functions with their equations

GE Pe	EORGIA Mathematics 3 rformance Standards	ACT Mathematics College Readiness Standards
C.	Apply and adapt a variety of appropriate strategies to	Expressions, Equations, & Inequalities:
0.	solve problems.	Write expressions that require planning and/or manipulating to accurately model a situation
		Write equations and inequalities that require planning, manipulating, and/or solving
		Graphical Representations:
		Solve problems integrating multiple algebraic and/or geometric concepts
		Properties of Plane Figures:
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
d.	Monitor and reflect on the process of mathematical problem solving.	
MN	I3P2. Students will reason and evaluate mathematical	
arg	juments.	1
а.	Recognize reasoning and proof as fundamental aspects of mathematics.	
b.	Make and investigate mathematical conjectures.	Probability, Statistics, & Data Analysis:
		Analyze and draw conclusions based on information from figures, tables, and graphs
		Numbers: Concepts & Properties:
		Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
		Graphical Representations:
		Analyze and draw conclusions based on information from graphs in the coordinate plane Properties of Plane Figures:
		Draw conclusions based on a set of conditions
C.	Develop and evaluate mathematical arguments and	Probability, Statistics, & Data Analysis:
	proofs.	Analyze and draw conclusions based on information from figures, tables, and graphs
		Numbers: Concepts & Properties:
		Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
		Graphical Representations:
		Analyze and draw conclusions based on information from graphs in the coordinate plane
		Properties of Plane Figures:
		Draw conclusions based on a set of conditions

GE Pe	ORGIA Mathematics 3 rformance Standards	ACT Mathematics College Readiness Standards
d.	Select and use various types of reasoning and methods	Numbers: Concepts & Properties:
	of proof.	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
		Properties of Plane Figures:
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
MN	13P3. Students will communicate mathematically.	
а.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
C.	Analyze and evaluate the mathematical thinking and strategies of others.	
d.	Use the language of mathematics to express	Expressions, Equations, & Inequalities:
	mathematical ideas precisely.	Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
		Write expressions that require planning and/or manipulating to accurately model a situation
		Write equations and inequalities that require planning, manipulating, and/or solving
MM3P4. Students will make connections among mathematical ideas and to other disciplines.		
a.	Recognize and use connections among mathematical	Properties of Plane Figures:
	ideas.	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	
C.	Recognize and apply mathematics in contexts outside of mathematics.	
MM3P5. Students will represent mathematics in multiple ways.		
a.	Create and use representations to organize, record,	Probability, Statistics, & Data Analysis:
	and communicate mathematical ideas.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
b.	Select, apply, and translate among mathematical	Basic Operations & Applications:
	representations to solve problems.	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)
		Probability, Statistics, & Data Analysis:
		Interpret and use information from figures, tables, and graphs

GEORGIA Mathematics 3	ACT Mathematics
Performance Standards	College Readiness Standards
	Analyze and draw conclusions based on information from figures, tables, and graphs
	Expressions, Equations, & Inequalities:
	Write equations and inequalities that require planning, manipulating, and/or solving
	Graphical Representations:
	Solve problems integrating multiple algebraic and/or geometric concepts
	Properties of Plane Figures:
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
c. Use representations to model and interpret physical,	Probability, Statistics, & Data Analysis:
social, and mathematical phenomena.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Manipulate data from tables and graphs
	Interpret and use information from figures, tables, and graphs
	Analyze and draw conclusions based on information from figures, tables, and graphs
	Expressions, Equations, & Inequalities:
	Perform straightforward word-to-symbol translations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Write expressions, equations, and inequalities for common algebra settings
	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Graphical Representations:
	Analyze and draw conclusions based on information from graphs in the coordinate plane
MATH READING CONTENT	
Students will enhance reading in all curriculum areas by:	
a. Reading in all curriculum areas	
• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas	
 Read both informational and fictional texts in a variety of genres and modes of discourse 	
Read technical texts related to various subject areas	

GEORGIA Mathematics 3 Performance Standards	ACT Mathematics College Readiness Standards
b. Discussing books	
 Discuss messages and themes from books in all subject areas. 	
 Respond to a variety of texts in multiple modes of discourse. 	
 Relate messages and themes from one subject area to messages and themes in another area. 	
 Evaluate the merit of texts in every subject discipline. 	
 Examine author's purpose in writing. 	
 Recognize the features of disciplinary texts. 	
c. Building vocabulary knowledge	
 Demonstrate an understanding of contextual vocabulary in various subjects. 	
 Use content vocabulary in writing and speaking. 	
 Explore understanding of new words found in subject area texts. 	
d. Establishing context	
 Explore life experiences related to subject area content. 	
 Discuss in both writing and speaking how certain words are subject area related. 	
 Determine strategies for finding content and contextual meaning for unknown words. 	

GE Sta	ORGIA Mathematics 3 andards	ACT's WorkKeys Applied Mathematics Level Skills	
AL	ALGEBRA		
Students will investigate exponential, logarithmic and polynomial functions of degree higher than 2. Students will understand matrices and use them to solve problems.			
MN fun	I3A1. Students will analyze graphs of polynomial ctions of higher degree.		
a.	Graph simple polynomial functions as translations of the function $f(x) = ax^n$.		
b.	Understand the effects of the following on the graph of a polynomial function: degree, lead coefficient, and multiplicity of real zeros.		
C.	Determine whether a polynomial function has symmetry and whether it is even, odd, or neither.		
d.	Investigate and explain characteristics of polynomial functions, including domain and range, intercepts, zeros, relative and absolute extrema, intervals of increase and decrease, and end behavior.		
MN inve	13A2. Students will explore logarithmic functions as erses of exponential functions.		
a.	Define and understand the properties of <i>n</i> th roots.		
b.	Extend properties of exponents to include rational exponents.		
C.	Define logarithmic functions as inverses of exponential functions.		
d.	Understand and use properties of logarithms by extending laws of exponents.		
e.	Investigate and explain characteristics of exponential and logarithmic functions including domain and range, asymptotes, zeros, intercepts, intervals of increase and decrease, and rate of change.		
f.	Graph functions as transformations of $f(x) = a^x$, $f(x) = \log_a x$, $f(x) = e^x$, $f(x) = \ln x$.		
g.	Explore real phenomena related to exponential and logarithmic functions including half-life and doubling	Calculate perimeters and areas of basic shapes (rectangles and circles)	
	time.	Rearrange a formula before solving a problem	
		Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations	
		Find the volume of rectangular solids	
		Calculate multiple areas and volumes of spheres, cylinders, or cones	
MM3A3. Students will solve a variety of equations and inequalities.			
a.	Find real and complex roots of higher degree polynomial equations using the factor theorem, remainder theorem, rational root theorem, and fundamental theorem of algebra, incorporating complex and radical conjugates.		

GE Sta	ORGIA Mathematics 3 andards	ACT's WorkKeys Applied Mathematics Level Skills	
b.	Solve polynomial, exponential, and logarithmic equations analytically, graphically, and using appropriate technology.		
C.	Solve polynomial, exponential, and logarithmic inequalities analytically, graphically, and using appropriate technology. Represent solution sets of inequalities using interval notation.		
d.	Solve a variety of types of equations by appropriate means choosing among mental calculation, pencil and	Put the information in the right order before performing calculations	
	paper, or appropriate technology.	Decide what information, calculations, or unit conversions to use to solve the problem	
		Look up a formula and perform single-step conversions within or between systems of measurement	
		Rearrange a formula before solving a problem	
		Solve problems that include nonlinear functions and/or that involve more than one unknown	
		Set up and manipulate complex ratios or proportions	
MN ma	13A4. Students will perform basic operations with trices.		
a.	Add, subtract, multiply, and invert matrices, when possible, choosing appropriate methods, including technology.		
b.	Find the inverses of two-by-two matrices using pencil and paper, and find inverses of larger matrices using technology.		
C.	Examine the properties of matrices, contrasting them with properties of real numbers.		
MN pro	13A5. Students will use matrices to formulate and solve blems.		
a.	Represent a system of linear equations as a matrix equation.		
b.	Solve matrix equations using inverse matrices.		
C.	Represent and solve realistic problems using systems of linear equations.		
MN in t	I3A6. Students will solve linear programming problems wo variables.		
a.	Solve systems of inequalities in two variables, showing the solutions graphically.		
b.	Represent and solve realistic problems using linear programming.		
MN rep	13A7. Students will understand and apply matrix resentations of vertex-edge graphs.		
a.	Use graphs to represent realistic situations.		
b.	Use matrices to represent graphs, and solve problems that can be represented by graphs.		
GE	GEOMETRY		
Stu cor	dents will understand and use the analytic geometry of ic sections and of planes and spheres in space.		

GEORGIA Mathematics 3 Standards	ACT's WorkKeys Applied Mathematics Level Skills	
MM3G1. Students will investigate the relationships between lines and circles.		
a. Find equations of circles.		
b. Graph a circle given an equation in general form.		
c. Find the equation of a tangent line to a circle at a given point.		
d. Solve a system of equations involving a circle and a line.		
e. Solve a system of equations involving two circles.		
MM3G2. Students will recognize, analyze, and graph the equations of the conic sections (parabolas, circles, ellipses, and hyperbolas).		
a. Convert equations of conics by completing the square.		
 Graph conic sections, identifying fundamental characteristics. 		
 Write equations of conic sections given appropriate information. 		
MM3G3. Students will investigate planes and spheres.		
a. Plot the point (<i>x</i> , <i>y</i> , <i>z</i>) and understand it as a vertex of a rectangular prism.		
b. Apply the distance formula in 3-space.		
 Recognize and understand equations of planes and spheres. 		
DATA ANALYSIS AND PROBABILITY		
Students will use a normal distribution to calculate probabilities. They will organize, represent, investigate, interpret, and make inferences using data from both observational studies and experiments.		
MM3D1. Students will create probability histograms of discrete random variables, using both experimental and theoretical probabilities.		
MM3D2. Students will solve problems involving probabilities by interpreting a normal distribution as a probability histogram for a continuous random variable (z-scores are used for a general normal distribution).		
 Determine intervals about the mean that include a given percent of data. 		
b. Determine the probability that a given value falls within a specified interval.		
 Estimate how many items in a population fall within a specified interval. 		
MM3D3. Students will understand the differences between experimental and observational studies by posing questions and collecting, analyzing, and interpreting data.		

GEORGIA Mathematics 3 Standards	ACT's WorkKeys Applied Mathematics Level Skills
PROCESS STANDARDS	
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.	
MM3P1. Students will solve problems (using appropriate technology).	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
	Put the information in the right order before performing calculations
	Decide what information, calculations, or unit conversions to use to solve the problem
	Look up a formula and perform single-step conversions within or between systems of measurement
	Find the best deal using one- and two-step calculations and then comparing results
	Calculate perimeters and areas of basic shapes (rectangles and circles)
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem
	Use two formulas to change from one unit to another within the same system of measurement
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
	Find the volume of rectangular solids
	Calculate multiple rates
	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
	Calculate multiple areas and volumes of spheres, cylinders, or cones
	Set up and manipulate complex ratios or proportions
	Find the best deal when there are several choices
 Build new mathematical knowledge through problem solving. 	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
	Put the information in the right order before performing calculations
	Decide what information, calculations, or unit conversions to use to solve the problem
	Look up a formula and perform single-step conversions within or between systems of measurement
	Find the best deal using one- and two-step calculations and

GEORGIA Mathematics 3 Standards	ACT's WorkKeys Applied Mathematics Level Skills
	then comparing results
	Calculate perimeters and areas of basic shapes (rectangles and circles)
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem
	Use two formulas to change from one unit to another within the same system of measurement
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
	Find the volume of rectangular solids
	Calculate multiple rates
	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
	Calculate multiple areas and volumes of spheres, cylinders, or cones
	Set up and manipulate complex ratios or proportions
	Find the best deal when there are several choices
b. Solve problems that arise in mathematics and in oth contexts.	er Change numbers from one form to another using whole numbers, fractions, decimals, or percentages
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
	Put the information in the right order before performing calculations
	Decide what information, calculations, or unit conversions to use to solve the problem
	Look up a formula and perform single-step conversions within or between systems of measurement
	Find the best deal using one- and two-step calculations and then comparing results
	Calculate perimeters and areas of basic shapes (rectangles and circles)
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem
	Use two formulas to change from one unit to another within the same system of measurement
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
	Find the volume of rectangular solids

GEORGIA Mathematics 3 Standards	ACT's WorkKeys Applied Mathematics Level Skills
	Calculate multiple rates
	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
	Calculate multiple areas and volumes of spheres, cylinders, or cones
	Set up and manipulate complex ratios or proportions
	Find the best deal when there are several choices
 Apply and adapt a variety of appropriate strategies to solve problems. 	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
	Put the information in the right order before performing calculations
	Decide what information, calculations, or unit conversions to use to solve the problem
	Look up a formula and perform single-step conversions within or between systems of measurement
	Find the best deal using one- and two-step calculations and then comparing results
	Calculate perimeters and areas of basic shapes (rectangles and circles)
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem
	Use two formulas to change from one unit to another within the same system of measurement
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
	Find the volume of rectangular solids
	Calculate multiple rates
	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
	Calculate multiple areas and volumes of spheres, cylinders, or cones
	Set up and manipulate complex ratios or proportions
	Find the best deal when there are several choices
d. Monitor and reflect on the process of mathematical	Find mistakes in items that belong at Levels 3, 4, and 5
	Find mistakes in Level 6 items
MM3P2. Students will reason and evaluate mathematical arguments.	
a. Recognize reasoning and proof as fundamental aspects of mathematics.	

GE Sta	ORGIA Mathematics 3 andards	ACT's WorkKeys Applied Mathematics Level Skills
b <mark>.</mark>	Make and investigate mathematical conjectures.	Rearrange a formula before solving a problem
		Solve problems that include nonlinear functions and/or that involve more than one unknown
		Set up and manipulate complex ratios or proportions
C.	Develop and evaluate mathematical arguments and proofs.	
d.	Select and use various types of reasoning and methods of proof.	
MN	13P3. Students will communicate mathematically.	
a.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
c.	Analyze and evaluate the mathematical thinking and	Find mistakes in items that belong at Levels 3, 4, and 5
	strategies of others.	Find mistakes in Level 6 items
		Find the best deal when there are several choices
d.	Use the language of mathematics to express mathematical ideas precisely.	
MN ma	13P4. Students will make connections among thematical ideas and to other disciplines.	
а.	Recognize and use connections among mathematical ideas.	
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	
C.	Recognize and apply mathematics in contexts outside of mathematics.	Decide what information, calculations, or unit conversions to use to solve the problem
MM3P5. Students will represent mathematics in multiple ways.		
a.	Create and use representations to organize, record, and communicate mathematical ideas.	
b.	Select, apply, and translate among mathematical representations to solve problems.	Put the information in the right order before performing calculations
		Decide what information, calculations, or unit conversions to use to solve the problem
C.	Use representations to model and interpret physical, social, and mathematical phenomena.	
M	MATH READING CONTENT	
Stu	idents will enhance reading in all curriculum areas by:	
a.	Reading in all curriculum areas	
	• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas	
	 Read both informational and fictional texts in a variety of genres and modes of discourse 	
	Read technical texts related to various subject areas	
TABLE G

GEORGIA Mathematics 3 Standards		ACT's WorkKeys Applied Mathematics Level Skills
b.	Discussing books	
	 Discuss messages and themes from books in all subject areas. 	
	 Respond to a variety of texts in multiple modes of discourse. 	
	 Relate messages and themes from one subject area to messages and themes in another area. 	
	• Evaluate the merit of texts in every subject discipline.	
	 Examine author's purpose in writing. 	
	 Recognize the features of disciplinary texts. 	
C.	Building vocabulary knowledge	
	 Demonstrate an understanding of contextual vocabulary in various subjects. 	
	 Use content vocabulary in writing and speaking. 	
	• Explore understanding of new words found in subject area texts.	
d.	Establishing context	
	 Explore life experiences related to subject area content. 	
	 Discuss in both writing and speaking how certain words are subject area related. 	
	 Determine strategies for finding content and contextual meaning for unknown words. 	

GEORGIA Mathematics 4 Performance Standards

ACT Mathematics College Readiness Standards

ALGEBRA		
Students will analyze rational and trigonometric functions. Students will investigate and apply sequences and series and will understand and use vectors.		
MN	14A1. Students will explore rational functions.	
a.	Investigate and explain characteristics of rational functions, including domain, range, zeros, points of discontinuity, intervals of increase and decrease, rates of change, local and absolute extrema, symmetry, asymptotes, and end behavior.	Graphical Representations: Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
b.	Find inverses of rational functions, discussing domain and range, symmetry, and function composition.	Expressions, Equations, & Inequalities: Manipulate expressions and equations
C.	Solve rational equations and inequalities analytically, graphically, and by using appropriate technology.	
MN trig	I4A2. Students will use the circle to define the ponometric functions.	
a.	Define and understand angles measured in degrees and radians, including but not limited to 0°, 30°, 45°, 60°, 90°, their multiples, and equivalences.	Functions: Exhibit knowledge of unit circle trigonometry
b.	Understand and apply the six trigonometric functions as functions of general angles in standard position.	Functions: Exhibit knowledge of unit circle trigonometry
C.	Find values of trigonometric functions using points on the terminal sides of angles in the standard position.	Functions: Exhibit knowledge of unit circle trigonometry
d.	Understand and apply the six trigonometric functions as functions of arc length on the unit circle.	Functions: Exhibit knowledge of unit circle trigonometry
e.	Find values of trigonometric functions using the unit circle.	Functions: Exhibit knowledge of unit circle trigonometry
MM4A3. Students will investigate and use the graphs of the six trigonometric functions.		
a.	Understand and apply the six basic trigonometric functions as functions of real numbers.	
b.	Determine the characteristics of the graphs of the six basic trigonometric functions.	Functions: Match graphs of basic trigonometric functions with their equations
C.	Graph transformations of trigonometric functions including changing period, amplitude, phase shift, and vertical shift.	
d.	Apply graphs of trigonometric functions in realistic contexts involving periodic phenomena.	

GEORGIA Mathematics 4 Performance Standards	ACT Mathematics College Readiness Standards	
MM4A4. Students will investigate functions.		
a. Compare and contrast properties of functions within	Numbers: Concepts & Properties:	
and across the following types: linear, quadratic,	Exhibit knowledge of logarithms and geometric sequences	
trigonometric, and piecewise.	Graphical Representations:	
	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
	Functions:	
	Match graphs of basic trigonometric functions with their equations	
b. Investigate transformations of functions.		
 Investigate characteristics of functions built through sum, difference, product, quotient, and composition. 		
MM4A5. Students will establish the identities below and	Functions:	
use them to simplify trigonometric expressions and verify equivalence statements. $\tan \theta = \frac{\sin \theta}{\cos \theta}$	Use trigonometric concepts and basic identities to solve problems	
$\cot\theta = \frac{\cos\theta}{\sin\theta}$		
$\sec\theta = \frac{1}{\cos\theta}$		
$\csc\theta = \frac{1}{\sin\theta}$		
$\sin^2\theta + \cos^2\theta = 1$		
$1 + \tan^2 \theta = \sec^2 \theta$ $1 + \cot^2 \theta = \csc^2 \theta$		
$\sin(\alpha \pm \beta) = \sin \alpha \cos \beta \pm \cos \alpha \sin \beta$		
$\cos(\alpha \pm \beta) = \cos \alpha \cos \beta \pm \sin \alpha \sin \beta$		
$sin(2\theta) = 2sin\theta cos\theta$ $cos(2\theta) = cos^2\theta - sin^2\theta$		
MM4A6. Students will solve trigonometric equations both graphically and algebraically.		
a. Solve trigonometric equations over a variety of	Functions:	
domains, using technology as appropriate.	Use trigonometric concepts and basic identities to solve problems	
b. Use the coordinates of a point on the terminal side of	Functions:	
	Exhibit knowledge of unit circle trigonometry	
c. Apply the law of sines and the law of cosines.	Functions:	
	Use trigonometric concepts and basic identities to solve problems	
MM4A7. Students will verify and apply $A = \frac{1}{2} absinC$ to find	Functions:	
the area of a triangle.	Use trigonometric concepts and basic identities to solve problems	
MM4A8. Students will investigate and use inverse sine, inverse cosine, and inverse tangent functions.		
a. Find values of the above functions using technology as	Functions:	
appropriate.	Apply basic trigonometric ratios to solve right-triangle problems	
	Use trigonometric concepts and basic identities to solve problems	

GEORGIA Mathematics 4 Performance Standards		ACT Mathematics College Readiness Standards
b.	Determine characteristics of the above functions and	Functions:
	their graphs.	Match graphs of basic trigonometric functions with their equations
MN	14A9. Students will use sequences and series.	
a.	Use and find recursive and explicit formulas for the terms of sequences.	Numbers: Concepts & Properties: Exhibit knowledge of logarithms and geometric sequences
		Expressions, Equations, & Inequalities:
		Write expressions, equations, and inequalities for common algebra settings
b.	Recognize and use simple arithmetic and geometric sequences.	Numbers: Concepts & Properties: Exhibit knowledge of logarithms and geometric sequences
C.	Find and apply the sums of finite and, where appropriate, infinite arithmetic and geometric series.	
d.	Use summation notation to explore finite series.	
MN	14A10. Students will understand and use vectors.	
а.	Represent vectors algebraically and geometrically.	
b.	Convert between vectors expressed using rectangular	Graphical Representations:
	and direction.	Use the distance formula
		Functions:
		problems
		Use trigonometric concepts and basic identities to solve problems
C.	Add, subtract, and compute scalar multiples of vectors.	
d.	Use vectors to solve realistic problems.	Graphical Representations:
		Solve problems integrating multiple algebraic and/or geometric concepts
		Properties of Plane Figures:
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
D/	TA ANALYSIS AND PROBABILITY	
Stu ma and Ce a p will cor	dents will organize, represent, investigate, interpret, and ke inferences from data, using the central limit theorem d the standard normal distribution. Students will apply the ntral Limit Theorem to calculate confidence intervals for opulation mean using data from large samples. Students use sample data and confidence intervals to draw nclusions about populations.	
MN the	14D1. Using simulation, students will develop the idea of central limit theorem.	
MN sar the lev	14D2. Using student-generated data from random nples of at least 30 members, students will determine margin of error and confidence interval for a specified el of confidence.	

GEORGIA Mathematics 4 Performance Standards	ACT Mathematics College Readiness Standards
MM4D3. Students will use confidence intervals and margins of error to make inferences from data about a population. Technology is used to evaluate confidence intervals, but students will be aware of the ideas involved.	
PROCESS STANDARDS	
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.	
MM4P1. Students will solve problems (using appropriate technology).	
a. Build new mathematical knowledge through problem solving.	
b. Solve problems that arise in mathematics and in other	Basic Operations & Applications:
contexts.	Perform one-operation computation with whole numbers and decimals
	Solve problems in one or two steps using whole numbers
	Perform common conversions (e.g., inches to feet or hours to minutes)
	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent
	Solve some routine two-step arithmetic problems
	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average
	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)
	Solve word problems containing several rates, proportions, or percentages
	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)
	Probability, Statistics, & Data Analysis:
	Calculate the average of a list of positive whole numbers
	Perform a single computation using information from a table or chart
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Read tables and graphs
	Perform computations on data from tables and graphs
	Use the relationship between the probability of an event and the probability of its complement
	Calculate the missing data value, given the average and all data values but one

GEORGIA Mathematics 4 Performance Standards	ACT Mathematics College Readiness Standards
	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Determine the probability of a simple event
	Exhibit knowledge of simple counting techniques
	Calculate the average, given the frequency counts of all the data values
	Manipulate data from tables and graphs
	Compute straightforward probabilities for common situations
	Use Venn diagrams in counting
	Calculate or use a weighted average
	Interpret and use information from figures, tables, and graphs
	Apply counting techniques
	Compute a probability when the event and/or sample space are not given or obvious
	Distinguish between mean, median, and mode for a list of numbers
	Analyze and draw conclusions based on information from figures, tables, and graphs
	Exhibit knowledge of conditional and joint probability
	Numbers: Concepts & Properties:
	Recognize equivalent fractions and fractions in lowest terms
	Recognize one-digit factors of a number
	Identify a digit's place value
	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	Find and use the least common multiple
	Order fractions
	Work with numerical factors
	Work with scientific notation
	Work with squares and square roots of numbers
	Work problems involving positive integer exponents
	Work with cubes and cube roots of numbers
	Determine when an expression is undefined
	Exhibit some knowledge of the complex numbers
	Apply number properties involving prime factorization
	Apply number properties involving even/odd numbers and factors/multiples
	Apply number properties involving positive/negative numbers
	Apply rules of exponents
	Multiply two complex numbers

GEORGIA Mathematics 4	ACT Mathematics
Performance Standards	College Readiness Standards
	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
	Exhibit knowledge of logarithms and geometric sequences
	Apply properties of complex numbers
	Expressions, Equations, & Inequalities:
	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)
	Solve equations in the form $x + a = b$, where <i>a</i> and <i>b</i> are whole numbers or decimals
	Substitute whole numbers for unknown quantities to evaluate expressions
	Solve one-step equations having integer or decimal answers
	Combine like terms (e.g., $2x + 5x$)
	Evaluate algebraic expressions by substituting integers for unknown quantities
	Add and subtract simple algebraic expressions
	Solve routine first-degree equations
	Perform straightforward word-to-symbol translations
	Multiply two binomials
	Solve real-world problems using first-degree equations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Identify solutions to simple quadratic equations
	Add, subtract, and multiply polynomials
	Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)
	Solve first-degree inequalities that do not require reversing the inequality sign
	Manipulate expressions and equations
	Write expressions, equations, and inequalities for common algebra settings
	Solve linear inequalities that require reversing the inequality sign
	Solve absolute value equations
	Solve quadratic equations
	Find solutions to systems of linear equations
	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Solve simple absolute value inequalities
	Graphical Representations:
	Identify the location of a point with a positive coordinate on the number line

GEORGIA Mathematics 4 Performance Standards	ACT Mathematics College Readiness Standards
	Locate points on the number line and in the first quadrant
	Locate points in the coordinate plane
	Comprehend the concept of length on the number line
	Exhibit knowledge of slope
	Identify the graph of a linear inequality on the number line
	Determine the slope of a line from points or equations
	Match linear graphs with their equations
	Find the midpoint of a line segment
	Interpret and use information from graphs in the coordinate plane
	Match number line graphs with solution sets of linear inequalities
	Use the distance formula
	Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point
	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)
	Match number line graphs with solution sets of simple quadratic inequalities
	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
	Solve problems integrating multiple algebraic and/or geometric concepts
	Analyze and draw conclusions based on information from graphs in the coordinate plane
	Properties of Plane Figures:
	Exhibit some knowledge of the angles associated with parallel lines
	Find the measure of an angle using properties of parallel lines
	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
	Use several angle properties to find an unknown angle measure
	Recognize Pythagorean triples
	Use properties of isosceles triangles
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
	Use the Pythagorean theorem
	Draw conclusions based on a set of conditions
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
	Use relationships among angles, arcs, and distances in a circle

GEORGIA Mathematics 4 Performance Standards	ACT Mathematics College Readiness Standards
	Measurement:
	Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
	Compute the perimeter of polygons when all side lengths are given
	Compute the area of rectangles when whole number dimensions are given
	Compute the area and perimeter of triangles and rectangles in simple problems
	Use geometric formulas when all necessary information is given
	Compute the area of triangles and rectangles when one or more additional simple steps are required
	Compute the area and circumference of circles after identifying necessary information
	Compute the perimeter of simple composite geometric figures with unknown side lengths
	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure
	Use scale factors to determine the magnitude of a size change
	Compute the area of composite geometric figures when planning or visualization is required
	Functions:
	Evaluate quadratic functions, expressed in function notation, at integer values
	Evaluate polynomial functions, expressed in function notation, at integer values
	Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
	Evaluate composite functions at integer values
	Apply basic trigonometric ratios to solve right-triangle problems
	Write an expression for the composite of two simple functions
	Use trigonometric concepts and basic identities to solve problems
	Exhibit knowledge of unit circle trigonometry
	Match graphs of basic trigonometric functions with their equations
c. Apply and adapt a variety of appropriate strategies to	Expressions, Equations, & Inequalities:
solve problems.	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Graphical Representations:
	Solve problems integrating multiple algebraic and/or geometric concepts

GEORGIA Mathematics 4 Performance Standards		ACT Mathematics College Readiness Standards
		Properties of Plane Figures:
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
d.	Monitor and reflect on <mark>the process of mathematical problem solving.</mark>	
MN arg	14P2. Students will reason and evaluate mathematical uments.	
a.	Recognize reasoning and proof as fundamental aspects of mathematics.	
b.	Make and investigate mathematical conjectures.	Probability, Statistics, & Data Analysis:
		Analyze and draw conclusions based on information from figures, tables, and graphs
		Numbers: Concepts & Properties:
		Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
		Graphical Representations: Analyze and draw conclusions based on information from graphs in the coordinate plane Properties of Plane Figures:
		Draw conclusions based on a set of conditions
C.	Develop and evaluate mathematical arguments and	Probability, Statistics, & Data Analysis:
	proofs.	Analyze and draw conclusions based on information from figures, tables, and graphs
		Numbers: Concepts & Properties:
		Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
		Graphical Representations:
		Analyze and draw conclusions based on information from graphs in the coordinate plane
		Draw conclusions based on a set of conditions
d	Select and use various types of reasoning and methods	Numbers: Concepts & Properties:
u.	of proof.	Draw conclusions based on number concepts algebraic
		properties, and/or relationships between expressions and numbers
		Properties of Plane Figures:
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
MM4P3. Students will communicate mathematically.		
a.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
C.	Analyze and evaluate the mathematical thinking and strategies of others.	

GE Pe	EORGIA Mathematics 4 rformance Standards	ACT Mathematics College Readiness Standards
d.	Use the language of mathematics to express	Expressions, Equations, & Inequalities:
	mathematical ideas precisely.	Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
		Write expressions that require planning and/or manipulating to accurately model a situation
		Write equations and inequalities that require planning, manipulating, and/or solving
MN <mark>ma</mark>	I4P4. Students will make connections among thematical ideas and to other disciplines.	
a.	Recognize and use connections among mathematical	Properties of Plane Figures:
	ideas.	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	
C.	Recognize and apply mathematics in contexts outside of mathematics.	
MM4P5. Students will represent mathematics in multiple ways.		
a.	Create and use representations to organize, record,	Probability, Statistics, & Data Analysis:
	and communicate mathematical ideas.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
b.	Select, apply, and translate among mathematical	Basic Operations & Applications:
	representations to solve problems.	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings) Probability, Statistics, & Data Analysis:
		Interpret and use information from figures, tables, and graphs
		Analyze and draw conclusions based on information from figures, tables, and graphs
		Expressions, Equations, & Inequalities:
		Write equations and inequalities that require planning, manipulating, and/or solving
		Graphical Representations:
		Solve problems integrating multiple algebraic and/or geometric concepts
		Properties of Plane Figures:
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas

GEORGIA Mathematics 4 Performance Standards	ACT Mathematics College Readiness Standards	
c. Use representations to model and interpret physical,	Probability, Statistics, & Data Analysis:	
social, and mathematical phenomena.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)	
	Manipulate data from tables and graphs	
	Interpret and use information from figures, tables, and graphs	
	Analyze and draw conclusions based on information from figures, tables, and graphs	
	Expressions, Equations, & Inequalities:	
	Perform straightforward word-to-symbol translations	
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)	
	Write expressions, equations, and inequalities for common algebra settings	
	Write expressions that require planning and/or manipulating to accurately model a situation	
	Write equations and inequalities that require planning, manipulating, and/or solving	
	Graphical Representations:	
	Analyze and draw conclusions based on information from graphs in the coordinate plane	
MATH READING CONTENT		

Stu	Students will enhance reading in all curriculum areas by:	
a.	Reading in all curriculum areas	
	• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas	
	• Read both informational and fictional texts in a variety of genres and modes of discourse	
	Read technical texts related to various subject areas	
b.	Discussing books	
	 Discuss messages and themes from books in all subject areas. 	
	 Respond to a variety of texts in multiple modes of discourse. 	
	 Relate messages and themes from one subject area to messages and themes in another area. 	
	• Evaluate the merit of texts in every subject discipline.	
	 Examine author's purpose in writing. 	
	Recognize the features of disciplinary texts.	

GEORGIA Mathematics 4 Performance Standards		ACT Mathematics College Readiness Standards
C.	Building vocabulary knowledge	
	 Demonstrate an understanding of contextual vocabulary in various subjects. 	
	 Use content vocabulary in writing and speaking. 	
	 Explore understanding of new words found in subject area texts. 	
d.	Establishing context	
	 Explore life experiences related to subject area content. 	
	 Discuss in both writing and speaking how certain words are subject area related. 	
	 Determine strategies for finding content and contextual meaning for unknown words. 	

GE Sta	ORGIA Mathematics 4 andards	ACT's WorkKeys Applied Mathematics Level Skills
AL	GEBRA	
Students will analyze rational and trigonometric functions. Students will investigate and apply sequences and series and will understand and use vectors.		
MN	14A1. Students will explore rational functions.	
a.	Investigate and explain characteristics of rational functions, including domain, range, zeros, points of discontinuity, intervals of increase and decrease, rates of change, local and absolute extrema, symmetry, asymptotes, and end behavior.	
b.	Find inverses of rational functions, discussing domain and range, symmetry, and function composition.	
C.	Solve rational equations and inequalities analytically, graphically, and by using appropriate technology.	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals Decide what information, calculations, or unit conversions to use to solve the problem
		Use fractions, negative numbers, ratios, percentages, or mixed numbers
		Calculate multiple rates
		Solve problems that include nonlinear functions and/or that involve more than one unknown
		Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
		Set up and manipulate complex ratios or proportions
MM4A2. Students will use the circle to define the trigonometric functions.		
a.	Define and understand angles measured in degrees and radians, including but not limited to 0°, 30°, 45°, 60°, 90°, their multiples, and equivalences.	
b.	Understand and apply the six trigonometric functions as functions of general angles in standard position.	
C.	Find values of trigonometric functions using points on the terminal sides of angles in the standard position.	
d.	Understand and apply the six trigonometric functions as functions of arc length on the unit circle.	
e.	Find values of trigonometric functions using the unit circle.	
MM4A3. Students will investigate and use the graphs of the six trigonometric functions.		
a.	Understand and apply the six basic trigonometric functions as functions of real numbers.	
b.	Determine the characteristics of the graphs of the six basic trigonometric functions.	
C.	Graph transformations of trigonometric functions including changing period, amplitude, phase shift, and vertical shift.	
d.	Apply graphs of trigonometric functions in realistic contexts involving periodic phenomena.	

GEORGIA Mathematics 4 Standards	ACT's WorkKeys Applied Mathematics Level Skills
MM4A4. Students will investigate functions.	
a. Compare and contrast properties of functions within and across the following types: linear, quadratic, polynomial, power, rational, exponential, logarithmic, trigonometric, and piecewise.	
b. Investigate transformations of functions.	
c. Investigate characteristics of functions built through sum, difference, product, quotient, and composition.	Solve problems that require a single type of mathematics operation (addition, subtraction, multiplication, and division) using whole numbers
	Add or subtract negative numbers
	Solve problems that require one or two operations
	Divide pegative numbers
	Put the information in the right order before performing
	calculations
MM4A5. Students will establish the identities below and use them to simplify trigonometric expressions and verify equivalence statements.	
$\tan\theta = \frac{\sin\theta}{\cos\theta}$	
$\cot\theta = \frac{\cos\theta}{\sin\theta}$	
$\sec\theta = \frac{1}{\cos\theta}$	
$\csc\theta = \frac{1}{\sin\theta}$ $\sin^2\theta + \cos^2\theta = 1$ $\cot^2\theta + 1 = \csc^2\theta$ $\sin(\alpha + \beta) = \sin\alpha \cos\beta + \cos\alpha \sin\beta$	
$\cos(\alpha \pm \beta) = \cos \alpha \cos \beta \pm \sin \alpha \sin \beta$	
$sin(2\theta) = 2sin\theta cos\theta$ $cos(2\theta) = cos^2\theta - sin^2\theta$	
MM4A6. Students will solve trigonometric equations both graphically and algebraically.	
 Solve trigonometric equations over a variety of domains, using technology as appropriate. 	
 b. Use the coordinates of a point on the terminal side of an angle to express x as rcosθ and y as rsinθ. 	
c. Apply the law of sines and the law of cosines.	
MM4A7. Students will verify and apply $A = \frac{1}{2} ab \sin C$ to find	
the area of a triangle.	
MM4A8. Students will investigate and use inverse sine, inverse cosine, and inverse tangent functions.	
a. Find values of the above functions using technology as appropriate.	
b. Determine characteristics of the above functions and their graphs.	
MM4A9. Students will use sequences and series.	
a. Use and find recursive and explicit formulas for the	

GEORGIA Mathematics 4 Standards		ACT's WorkKeys Applied Mathematics Level Skills
	terms of sequences.	
b.	Recognize and use simple arithmetic and geometric sequences.	
C.	Find and apply the sums of finite and, where appropriate, infinite arithmetic and geometric series.	
d.	Use summation notation to explore finite series.	
MN	14A10. Students will understand and use vectors.	
a.	Represent vectors algebraically and geometrically.	
b.	Convert between vectors expressed using rectangular coordinates and vectors expressed using magnitude and direction.	
C.	Add, subtract, and compute scalar multiples of vectors.	
d.	Use vectors to solve realistic problems.	
DA	ATA ANALYSIS AND PROBABILITY	
Stu ma and Cer a p will cor	idents will organize, represent, investigate, interpret, and ke inferences from data, using the central limit theorem d the standard normal distribution. Students will apply the ntral Limit Theorem to calculate confidence intervals for opulation mean using data from large samples. Students use sample data and confidence intervals to draw nclusions about populations.	
MN the	14D1. Using simulation, students will develop the idea of central limit theorem.	
MN sar the leve	14D2. Using student-generated data from random nples of at least 30 members, students will determine margin of error and confidence interval for a specified el of confidence.	
MN of e Teo stue	14D3. Students will use confidence intervals and margins error to make inferences from data about a population. chnology is used to evaluate confidence intervals, but dents will be aware of the ideas involved.	
PR	OCESS STANDARDS	
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.		
MM4P1. Students will solve problems (using appropriate technology).		
a.	Build new mathematical knowledge through problem solving.	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages
		Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
		Put the information in the right order before performing calculations
		Decide what information, calculations, or unit conversions to use to solve the problem
		Look up a formula and perform single-step conversions within or between systems of measurement

GEORGIA Mathematics 4 Standards	ACT's WorkKeys Applied Mathematics Level Skills
	Find the best deal using one- and two-step calculations and then comparing results
	Calculate perimeters and areas of basic shapes (rectangles and circles)
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem
	Use two formulas to change from one unit to another within the same system of measurement
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
	Find the volume of rectangular solids
	Calculate multiple rates
	fractions, mixed numbers, decimals, and/or percentages
	Calculate multiple areas and volumes of spheres, cylinders, or cones
	Set up and manipulate complex ratios or proportions
	Find the best deal when there are several choices
b. Solve problems that arise in mathematics and in other contexts.	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
	Put the information in the right order before performing calculations
	Decide what information, calculations, or unit conversions to use to solve the problem
	Look up a formula and perform single-step conversions within or between systems of measurement
	Find the best deal using one- and two-step calculations and then comparing results
	Calculate perimeters and areas of basic shapes (rectangles and circles)
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem
	Use two formulas to change from one unit to another within the same system of measurement
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations

GEORGIA Mathematics 4 Standards	ACT's WorkKeys Applied Mathematics Level Skills
	Find the volume of rectangular solids
	Calculate multiple rates
	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
	Calculate multiple areas and volumes of spheres, cylinders, or cones
	Set up and manipulate complex ratios or proportions
	Find the best deal when there are several choices
 Apply and adapt a variety of appropriate strategies to solve problems. 	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
	Put the information in the right order before performing calculations
	Decide what information, calculations, or unit conversions to use to solve the problem
	Look up a formula and perform single-step conversions within or between systems of measurement
	Find the best deal using one- and two-step calculations and then comparing results
	Calculate perimeters and areas of basic shapes (rectangles and circles)
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem
	Use two formulas to change from one unit to another within the same system of measurement
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
	Find the volume of rectangular solids
	Calculate multiple rates
	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
	Calculate multiple areas and volumes of spheres, cylinders, or cones
	Set up and manipulate complex ratios or proportions
	Find the best deal when there are several choices
d. Monitor and reflect on the process of mathematical	Find mistakes in items that belong at Levels 3, 4, and 5
problem solving.	Find mistakes in Level 6 items
MM4P2. Students will reason and evaluate mathematical arguments.	
a. Recognize reasoning and proof as fundamental aspects of mathematics.	
b. Make and investigate mathematical conjectures.	Rearrange a formula before solving a problem

GEORGIA Mathematics 4 Standards		ACT's WorkKeys Applied Mathematics Level Skills	
		Solve problems that include nonlinear functions and/or that involve more than one unknown	
		Set up and manipulate complex ratios or proportions	
C.	Develop and evaluate mathematical arguments and proofs.		
d.	Select and use various types of reasoning and methods of proof.		
MN	14P3. Students will communicate mathematically.		
a.	Organize and consolidate their mathematical thinking through communication.		
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.		
C.	Analyze and evaluate the mathematical thinking and	Find mistakes in items that belong at Levels 3, 4, and 5	
	strategies of others.	Find mistakes in Level 6 items	
		Find the best deal when there are several choices	
d.	Use the language of mathematics to express mathematical ideas precisely.		
MM4P4. Students will make connections among mathematical ideas and to other disciplines.			
a.	Recognize and use connections among mathematical ideas.		
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.		
C.	Recognize and apply mathematics in contexts outside of mathematics.	Decide what information, calculations, or unit conversions to use to solve the problem	
MM4P5. Students will represent mathematics in multiple ways.			
a.	Create and use representations to organize, record, and communicate mathematical ideas.		
b.	Select, apply, and translate among mathematical representations to solve problems.	Put the information in the right order before performing calculations	
		Decide what information, calculations, or unit conversions to use to solve the problem	
C.	Use representations to model and interpret physical, social, and mathematical phenomena.		
M	MATH READING CONTENT		
Students will enhance reading in all curriculum areas by:			
а.	Reading in all curriculum areas		
	• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas		
	 Read both informational and fictional texts in a variety of genres and modes of discourse 		
	Read technical texts related to various subject areas		

GEORGIA Mathematics 4 Standards		ACT's WorkKeys Applied Mathematics Level Skills
b. Dise	cussing books	
• D si	Discuss messages and themes from books in all ubject areas.	
• R di	Respond to a variety of texts in multiple modes of iscourse.	
• R to	Relate messages and themes from one subject area on messages and themes in another area.	
• E	valuate the merit of texts in every subject discipline.	
• E	xamine author's purpose in writing.	
• R	Recognize the features of disciplinary texts.	
c. Buil	lding vocabulary knowledge	
• D v(emonstrate an understanding of contextual ocabulary in various subjects.	
• U	Ise content vocabulary in writing and speaking.	
• E a	xplore understanding of new words found in subject rea texts.	
d. Esta	ablishing context	
• E c	xplore life experiences related to subject area ontent.	
• D w	Discuss in both writing and speaking how certain vords are subject area related.	
• D c	Determine strategies for finding content and ontextual meaning for unknown words.	

GEORGIA Core Math 1 Performance Standards

EXPLORE Mathematics College Readiness Standards

ALGEBRA		
Students will explore and interpret the characteristics of functions.		
MC1A1. Students will explore and interpret the characteristics of functions, using graphs, tables, and simple algebraic techniques.		
a.	Represent functions using function notation.	
b.	Graph the basic functions $f(x) = x^n$, where $n = 1$ to 3, $f(x) = \sqrt{x}$, $f(x) = x $, and $f(x) = \frac{1}{x}$.	
C.	Graph transformations of basic functions including vertical shifts, stretches, and shrinks, as well as reflections across the <i>x</i> - and <i>y</i> -axes.	
d.	Investigate and explain the characteristics of a function: domain, range, zeros, intercepts, intervals of increase and decrease, maximum and minimum values, and end behavior.	
e.	Relate to a given context the characteristics of a function, and use graphs and tables to investigate its behavior.	
f.	Recognize sequences as functions with domains that are whole numbers.	
g.	Explore rates of change, comparing constant rates of change (i.e., slope) versus variable rates of change. Compare rates of change of linear, quadratic, square root, and other function families.	
h.	Determine graphically and algebraically whether a function has symmetry and whether it is even, odd, or neither.	
i.	Understand that any equation in <i>x</i> can be interpreted as the equation $f(x) = g(x)$, and interpret the solutions of the equation as the <i>x</i> -value(s) of the intersection point(s) of the graphs of $y = f(x)$ and $y = g(x)$.	
GE	OMETRY	
The student will apply properties of polygons and determine distances.		
MC <mark>figu</mark>	1G1. Students will investigate properties of geometric ares in the coordinate plane.	
a.	Determine the distance between two points.	
b.	Determine the distance between a point and a line.	
C.	Determine the midpoint of a segment.	
d.	Understand the distance formula as an application of the Pythagorean theorem.	
e.	Use the coordinate plane to investigate properties of and verify conjectures related to triangles and quadrilaterals.	

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GEORGIA Core Math 1 Performance Standards

EXPLORE Mathematics College Readiness Standards

DATA ANALYSIS AND PROBABILITY		
Students will use counting techniques and determine		
probability.		
MC1D1. Students will determine the number of outcomes related to a given event		
a. Apply addition and multiplication principles of counting.		
b. Calculate and use simple permutations and combinations.		
MC1D2. Students will use the basic laws of probability		
a. Find the probabilities of mutually exclusive events.	Probability, Statistics, & Data Analysis:	
	Determine the probability of a simple event	
	Compute straightforward probabilities for common situations	
b. Find the probabilities of dependent events.	Probability, Statistics, & Data Analysis:	
	Compute straightforward probabilities for common situations	
c. Calculate conditional probabilities.		
d. Use expected value to predict outcomes.		
PROCESS STANDARDS		
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.		
MC1P1. Students will solve problems (using appropriate technology).		
a. Build new mathematical knowledge through problem solving.		
b. Solve problems that arise in mathematics and in other	Basic Operations & Applications:	
contexts.	Perform one-operation computation with whole numbers and decimals	
	Solve problems in one or two steps using whole numbers	
	Perform common conversions (e.g., inches to feet or hours to minutes)	
	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent	
	Solve some routine two-step arithmetic problems	
	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average	
	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)	
	Probability, Statistics, & Data Analysis:	
	Calculate the average of a list of positive whole numbers	
	Perform a single computation using information from a table or chart	

GEORGIA Core Math 1	EXPLORE Mathematics
Performance Standards	College Readiness Standards
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Read tables and graphs
	Perform computations on data from tables and graphs
	Use the relationship between the probability of an event and the probability of its complement
	Calculate the missing data value, given the average and all data values but one
	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Determine the probability of a simple event
	Calculate the average, given the frequency counts of all the data values
	Manipulate data from tables and graphs
	Compute straightforward probabilities for common situations
	Numbers: Concepts & Properties:
	Recognize equivalent fractions and fractions in lowest terms
	Recognize one-digit factors of a number
	Identify a digit's place value
	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	Find and use the least common multiple
	Order fractions
	Work with numerical factors
	Work with scientific notation
	Work with squares and square roots of numbers
	Expressions, Equations, & Inequalities:
	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)
	Solve equations in the form $x + a = b$, where a and b are whole numbers or decimals
	Substitute whole numbers for unknown quantities to evaluate expressions
	Solve one-step equations having integer or decimal answers
	Combine like terms (e.g., $2x + 5x$)
	Evaluate algebraic expressions by substituting integers for unknown quantities
	Add and subtract simple algebraic expressions
	Solve routine first-degree equations
	Perform straightforward word-to-symbol translations
	Solve real-world problems using first-degree equations

GEORGIA Core Math 1 Performance Standards	EXPLORE Mathematics
	variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Identify solutions to simple quadratic equations
	Graphical Representations:
	Identify the location of a point with a positive coordinate on the number line
	Locate points on the number line and in the first quadrant
	Locate points in the coordinate plane
	Properties of Plane Figures:
	Exhibit some knowledge of the angles associated with parallel lines
	Find the measure of an angle using properties of parallel lines
	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
	Use several angle properties to find an unknown angle measure
	Measurement:
	Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
	Compute the perimeter of polygons when all side lengths are given
	Compute the area of rectangles when whole number dimensions are given
	Compute the area and perimeter of triangles and rectangles in simple problems
	Use geometric formulas when all necessary information is given
	Compute the area of triangles and rectangles when one or more additional simple steps are required
	Compute the area and circumference of circles after identifying necessary information
c. Apply and adapt a variety of appropriate strategies to solve problems.	
d. Monitor and reflect on the process of mathematical problem solving.	
MC1P2. Students will reason and evaluate mathematical	
arguments.	1
a. Recognize reasoning and proof as fundamental aspects of mathematics.	
b. Make and investigate mathematical conjectures.	
c. Develop and evaluate mathematical arguments and proofs.	
d. Select and use various types of reasoning and methods of proof.	

GE	ORGIA Core Math 1	EXPLORE Mathematics
MC1P3 Students will communicate mathematically		
2	Organize and consolidate their mathematical thinking	
a.	through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
C.	Analyze and evaluate the mathematical thinking and strategies of others.	
d.	Use the language of mathematics to express	Expressions, Equations, & Inequalities:
	mathematical ideas precisely.	Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
MC1P4. Students will make connections among mathematical ideas and to other disciplines.		
a.	Recognize and use connections among mathematical ideas.	
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	
C.	Recognize and apply mathematics in contexts outside of mathematics.	
MC1P5. Students will represent mathematics in multiple ways.		
a.	Create and use representations to organize, record,	Probability, Statistics, & Data Analysis:
	and communicate mathematical ideas.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
b.	Select, apply, and translate among mathematical representations to solve problems.	
C.	Use representations to model and interpret physical,	Probability, Statistics, & Data Analysis:
	social, and mathematical phenomena.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
		Manipulate data from tables and graphs
		Expressions, Equations, & Inequalities:
		Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)

GEORGIA Core Math 1 Performance Standards

EXPLORE Mathematics College Readiness Standards

	MATH READING CONTENT	
Students will enhance reading in all curriculum areas by:		
	a. Reading in all curriculum areas	
	 Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas 	

- Read both informational and fictional texts in a variety of genres and modes of discourse
- Read technical texts related to various subject areasb. Discussing books
 - Discuss messages and themes from books in all subject areas.
 - Respond to a variety of texts in multiple modes of discourse.
 - Relate messages and themes from one subject area to messages and themes in another area.
 - Evaluate the merit of texts in every subject discipline.
 - Examine author's purpose in writing.Recognize the features of disciplinary texts.
- c. Building vocabulary knowledge
 - Demonstrate an understanding of contextual vocabulary in various subjects.
 - Use content vocabulary in writing and speaking.
 - Explore understanding of new words found in subject area texts.
- d. Establishing context
 Explore life experiences related to subject area content.
 - Discuss in both writing and speaking how certain words are subject area related.
 - Determine strategies for finding content and contextual meaning for unknown words.

GEORGIA Core Math 1 Performance Standards

PLAN Mathematics College Readiness Standards

ALGEBRA			
Students will explore and interpret the characteristics of functions.			
MC cha sim	MC1A1. Students will explore and interpret the characteristics of functions, using graphs, tables, and simple algebraic techniques.		
a.	Represent functions using function notation.		
b.	Graph the basic functions $f(x) = x^n$, where $n = 1$ to 3, $f(x) = \sqrt{x}$, $f(x) = x $, and $f(x) = \frac{1}{x}$.		
C.	Graph transformations of basic functions including vertical shifts, stretches, and shrinks, as well as reflections across the <i>x</i> - and <i>y</i> -axes.		
d.	Investigate and explain the characteristics of a function: domain, range, zeros, intercepts, intervals of increase and decrease, maximum and minimum values, and end behavior.		
e.	Relate to a given context the characteristics of a function, and use graphs and tables to investigate its behavior.		
f.	Recognize sequences as functions with domains that are whole numbers.		
g.	Explore rates of change, comparing constant rates of change (i.e., slope) versus variable rates of change. Compare rates of change of linear, quadratic, square root, and other function families.	Graphical Representations: Exhibit knowledge of slope Determine the slope of a line from points or equations	
h.	Determine graphically and algebraically whether a function has symmetry and whether it is even, odd, or neither.		
i.	Understand that any equation in x can be interpreted as the equation $f(x) = g(x)$, and interpret the solutions of the equation as the x-value(s) of the intersection point(s) of the graphs of $y = f(x)$ and $y = g(x)$.	Expressions, Equations, & Inequalities: Find solutions to systems of linear equations	
GE	OMETRY		
The dist	e student will apply properties of polygons and determine tances.		
MC1G1. Students will investigate properties of geometric figures in the coordinate plane.			
a.	Determine the distance between two points.	Graphical Representations:	
		Use the distance formula	
b.	Determine the distance between a point and a line.	Graphical Representations:	
		Use the distance formula	
C.	Determine the midpoint of a segment.	Graphical Representations:	
		Find the midpoint of a line segment	
d.	Understand the distance formula as an application of the Pythagorean theorem.	Properties of Plane Figures:	
		Use the Pythagorean theorem	

GEORGIA Core Math 1 Performance Standards	PLAN Mathematics College Readiness Standards
e. Use the coordinate plane to investigate properties of and verify conjectures related to triangles and quadrilaterals.	
DATA ANALYSIS AND PROBABILITY	
Students will use counting techniques and determine probability.	
MC1D1. Students will determine the number of outcomes related to a given event	
a. Apply addition and multiplication principles of counting.	Probability, Statistics, & Data Analysis: Exhibit knowledge of simple counting techniques
	Use Venn diagrams in counting
	Apply counting techniques
b. Calculate and use simple permutations and combinations.	
MC1D2. Students will use the basic laws of probability	
a. Find the probabilities of mutually exclusive events.	Probability, Statistics, & Data Analysis:
	Determine the probability of a simple event
	Compute straightforward probabilities for common situations
b. Find the probabilities of dependent events.	Probability, Statistics, & Data Analysis:
	Compute straightforward probabilities for common situations
c. Calculate conditional probabilities.	
d. Use expected value to predict outcomes.	
PROCESS STANDARDS	
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.	
MC1P1. Students will solve problems (using appropriate technology).	
a. Build new mathematical knowledge through problem solving.	
b. Solve problems that arise in mathematics and in other	Basic Operations & Applications:
contexts.	Perform one-operation computation with whole numbers and decimals
	Solve problems in one or two steps using whole numbers
	Perform common conversions (e.g., inches to feet or hours to minutes)
	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent
	Solve some routine two-step arithmetic problems
	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average

GEORGIA Core Math 1	PLAN Mathematics
Performance Standards	College Readiness Standards
	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)
	Solve word problems containing several rates, proportions, or percentages
	Probability, Statistics, & Data Analysis:
	Calculate the average of a list of positive whole numbers
	Perform a single computation using information from a table or chart
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Read tables and graphs
	Perform computations on data from tables and graphs
	Use the relationship between the probability of an event and the probability of its complement
	Calculate the missing data value, given the average and all data values but one
	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Determine the probability of a simple event
	Exhibit knowledge of simple counting techniques
	Calculate the average, given the frequency counts of all the data values
	Manipulate data from tables and graphs
	Compute straightforward probabilities for common situations
	Use Venn diagrams in counting
	Calculate or use a weighted average
	Interpret and use information from figures, tables, and graphs
	Apply counting techniques
	Compute a probability when the event and/or sample space are not given or obvious
	Numbers: Concepts & Properties:
	Recognize equivalent fractions and fractions in lowest terms
	Recognize one-digit factors of a number
	Identify a digit's place value
	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	Find and use the least common multiple
	Order fractions
	Work with numerical factors
	Work with scientific notation
	Work with squares and square roots of numbers

GEORGIA Core Math 1 Performance Standards	PLAN Mathematics College Readiness Standards
	Work problems involving positive integer exponents
	Work with cubes and cube roots of numbers
	Determine when an expression is undefined
	Apply number properties involving prime factorization
	Apply number properties involving even/odd numbers and factors/multiples
	Apply number properties involving positive/negative numbers
	Apply rules of exponents
	Expressions, Equations, & Inequalities:
	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)
	Solve equations in the form $x + a = b$, where <i>a</i> and <i>b</i> are whole numbers or decimals
	Substitute whole numbers for unknown quantities to evaluate expressions
	Solve one-step equations having integer or decimal answers
	Combine like terms (e.g., $2x + 5x$)
	Evaluate algebraic expressions by substituting integers for unknown quantities
	Add and subtract simple algebraic expressions
	Solve routine first-degree equations
	Perform straightforward word-to-symbol translations
	Multiply two binomials
	Solve real-world problems using first-degree equations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Identify solutions to simple quadratic equations
	Add, subtract, and multiply polynomials
	Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)
	Solve first-degree inequalities that do not require reversing the inequality sign
	Manipulate expressions and equations
	Write expressions, equations, and inequalities for common algebra settings
	Solve linear inequalities that require reversing the inequality sign
	Solve absolute value equations
	Solve quadratic equations
	Find solutions to systems of linear equations
	Graphical Representations:
	Identify the location of a point with a positive coordinate on the number line

GEORGIA Core Math 1	PLAN Mathematics
Performance Standards	College Readiness Standards
	Locate points on the number line and in the first quadrant
	Locate points in the coordinate plane
	Comprehend the concept of length on the number line
	Exhibit knowledge of slope
	Identify the graph of a linear inequality on the number line
	Determine the slope of a line from points or equations
	Match linear graphs with their equations
	Find the midpoint of a line segment
	Interpret and use information from graphs in the coordinate plane
	Match number line graphs with solution sets of linear inequalities
	Use the distance formula
	Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point
	Properties of Plane Figures:
	Exhibit some knowledge of the angles associated with parallel lines
	Find the measure of an angle using properties of parallel lines
	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
	Use several angle properties to find an unknown angle measure
	Recognize Pythagorean triples
	Use properties of isosceles triangles
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
	Use the Pythagorean theorem
	Measurement:
	Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
	Compute the perimeter of polygons when all side lengths are given
	Compute the area of rectangles when whole number dimensions are given
	Compute the area and perimeter of triangles and rectangles in simple problems
	Use geometric formulas when all necessary information is given
	Compute the area of triangles and rectangles when one or more additional simple steps are required
	Compute the area and circumference of circles after identifying necessary information
	Compute the perimeter of simple composite geometric figures with unknown side lengths
	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure

GE Pe	ORGIA Core Math 1 rformance Standards	PLAN Mathematics College Readiness Standards
C.	Apply and adapt a variety of appropriate strategies to solve problems.	
d.	Monitor and reflect on the process of mathematical problem solving.	
MC arg	1P2. Students will reason and evaluate mathematical uments.	
a.	Recognize reasoning and proof as fundamental aspects of mathematics.	
b.	Make and investigate mathematical conjectures.	
C.	Develop and <mark>evaluate mathematical arguments and proofs.</mark>	
d.	Select and use various types of reasoning and methods of proof.	
MC	1P3. Students will communicate mathematically.	
a.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
C.	Analyze and evaluate the mathematical thinking and strategies of others.	
d.	Use the language of mathematics to express	Expressions, Equations, & Inequalities:
	mathematical ideas precisely.	Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
MC ma	1P4. Students will make connections among thematical ideas and to other disciplines.	
a.	Recognize and use connections among mathematical ideas.	
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	
C.	Recognize and apply mathematics in contexts outside of mathematics.	
MC way	MC1P5. Students will represent mathematics in multiple ways.	
а.	Create and use representations to organize, record,	Probability, Statistics, & Data Analysis:
	and communicate mathematical ideas.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
b.	Select, apply, and translate among mathematical	Probability, Statistics, & Data Analysis:
	representations to solve problems.	Interpret and use information from figures, tables, and graphs
C.	Use representations to model and interpret physical,	Probability, Statistics, & Data Analysis:
	social, and mathematical phenomena.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
		Manipulate data from tables and graphs
		Interpret and use information from figures, tables, and graphs

GEORGIA Core Math 1 Performance Standards	PLAN Mathematics College Readiness Standards
	Expressions, Equations, & Inequalities:
	Perform straightforward word-to-symbol translations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Write expressions, equations, and inequalities for common algebra settings
MATH READING CONTENT	
Students will enhance reading in all curriculum areas by:	
a. Reading in all curriculum areas	
 Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas 	
 Read both informational and fictional texts in a variety of genres and modes of discourse 	,
Read technical texts related to various subject areas	
b. Discussing books	
 Discuss messages and themes from books in all subject areas. 	
 Respond to a variety of texts in multiple modes of discourse. 	
 Relate messages and themes from one subject area to messages and themes in another area. 	
• Evaluate the merit of texts in every subject discipline.	
 Examine author's purpose in writing. 	
 Recognize the features of disciplinary texts. 	
c. Building vocabulary knowledge	
 Demonstrate an understanding of contextual vocabulary in various subjects. 	
 Use content vocabulary in writing and speaking. 	
 Explore understanding of new words found in subject area texts. 	
d. Establishing context	
 Explore life experiences related to subject area content. 	
 Discuss in both writing and speaking how certain words are subject area related. 	
 Determine strategies for finding content and contextual meaning for unknown words. 	

TABLE L

GEORGIA Core Math 2 Performance Standards

PLAN Mathematics College Readiness Standards

ALGEBRA		
Students will simplify and operate with radical expressions, polynomials, and rational expressions. Students will solve simple equations.		
MC <mark>exp</mark>	2A1. Students will simplify and operate with radical pressions, polynomials, and rational expressions.	
a.	Simplify algebraic and numeric expressions involving square root.	Numbers: Concepts & Properties: Work with squares and square roots of numbers Expressions, Equations, & Inequalities:
b.	Perform operations with square roots.	Expressions, Equations, & Inequalities: Manipulate expressions and equations
C.	Add, subtract, multiply, and divide polynomials.	Expressions, Equations, & Inequalities: Combine like terms (e.g., 2x + 5x) Add and subtract simple algebraic expressions Multiply two binomials Add, subtract, and multiply polynomials
d.	Add, subtract, multiply, and divide rational expressions.	Expressions, Equations, & Inequalities: Manipulate expressions and equations
e.	Factor expressions by greatest common factor, grouping, trial and error, and special products limited to the formulas below. $(x + y)^2 = x^2 + 2xy + y^2$ $(x - y)^2 = x^2 - 2xy + y^2$ $(x + y)(x - y) = x^2 - y^2$ $(x + a)(x + b) = x^2 + (a + b)x + ab$ $(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$ $(x - y)^3 = x^3 - 3x^2y + 3xy^2 - y^3$.	Expressions, Equations, & Inequalities: Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)
f.	Use area and volume models for polynomial arithmetic	Expressions, Equations, & Inequalities: Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
MC2A2. Students will solve simple equations.		
а.	Solve quadratic equations in the form $ax^2 + bx + c = 0$, where $a = 1$, by using factorization and finding square roots where applicable.	Expressions, Equations, & Inequalities: Solve quadratic equations
b.	Solve equations involving radicals such as $\sqrt{x} + b = c$, using algebraic techniques.	
C.	Use a variety of techniques, including technology, tables, and graphs to solve equations resulting from the investigation of $x^2 + bx + c = 0$.	Probability, Statistics, & Data Analysis: Interpret and use information from figures, tables, and graphs
d.	Solve simple rational equations that result in linear equations or quadratic equations with leading coefficient of 1.	Expressions, Equations, & Inequalities: Manipulate expressions and equations

TABLE L

GEORGIA Core Math 2 Performance Standards

PLAN Mathematics College Readiness Standards

GEOMETRY			
Stu Ian pro	Students will explore, understand and use the formal language of reasoning and justification. Students will apply properties of polygons.		
MC ma	MC2G1. Students will understand and use the language of mathematical argument and justification.		
a.	Use conjecture, inductive reasoning, deductive reasoning, counterexamples, and indirect proof as appropriate.		
b.	Understand and use the relationships among a statement and its converse, inverse, and contrapositive.		
MC of t	2G2. Students will discover, prove, and apply properties riangles, quadrilaterals, and other polygons.		
a.	Determine the sum of interior and exterior angles in a	Properties of Plane Figures:	
	polygon.	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)	
		Use several angle properties to find an unknown angle measure	
		Use properties of isosceles triangles	
b.	Understand and use the triangle inequality, the side- angle inequality, and the exterior-angle inequality.		
C.	Understand and use congruence postulates and	Properties of Plane Figures:	
	theorems for triangles (SSS, SAS, ASA, AAS, HL).	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles	
d.	Understand, use, and prove properties of and	Properties of Plane Figures:	
	relationships among special quadrilaterals: parallelogram, rectangle, rhombus, square, trapezoid, and kite	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)	
		Use several angle properties to find an unknown angle measure	
e.	Find and use points of concurrency in triangles: incenter, orthocenter, circumcenter, and centroid.		
DA	TA ANALYSIS AND PROBABILITY		
Students will demonstrate understanding of data analysis by posing questions to be answered by collecting data. Students will organize, represent, investigate, interpret, and make inferences from data.			
MC2D1. Students will relate samples to a population.			
a.	Compare summary statistics (mean, median, quartiles,	Probability, Statistics, & Data Analysis:	
	and interquartile range) from one sample data distribution to another sample data distribution in describing center and variability of the data distributions.	Interpret and use information from figures, tables, and graphs	
b.	Compare the averages of the summary statistics from a large number of samples to the corresponding population parameters.		
C.	Understand that a random sample is used to improve the chance of selecting a representative sample.		

TABLE L

GEORGIA Core Math 2 Performance Standards	PLAN Mathematics College Readiness Standards
MC2D2. Students will explore variability of data by determining the mean absolute deviation (the average of the absolute values of the deviations).	
PROCESS STANDARDS	
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.	
MC2P1. Students will solve problems (using appropriate technology).	
a. Build new mathematical knowledge through problem solving.	
b. Solve problems that arise in mathematics and in other	Basic Operations & Applications:
contexts.	Perform one-operation computation with whole numbers and decimals
	Solve problems in one or two steps using whole numbers
	Perform common conversions (e.g., inches to feet or hours to minutes)
	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent
	Solve some routine two-step arithmetic problems
	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average
	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)
	Solve word problems containing several rates, proportions, or percentages
	Probability, Statistics, & Data Analysis:
	Calculate the average of a list of positive whole numbers
	Perform a single computation using information from a table or chart
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Read tables and graphs
	Perform computations on data from tables and graphs
	Use the relationship between the probability of an event and the probability of its complement
	Calculate the missing data value, given the average and all data values but one
	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Determine the probability of a simple event
	Exhibit knowledge of simple counting techniques
GEORGIA Core Math 2	PLAN Mathematics
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Performance Standards	College Readiness Standards
	Calculate the average, given the frequency counts of all the data values
	Manipulate data from tables and graphs
	Compute straightforward probabilities for common situations
	Use Venn diagrams in counting
	Calculate or use a weighted average
	Interpret and use information from figures, tables, and graphs
	Apply counting techniques
	Compute a probability when the event and/or sample space are not given or obvious
	Numbers: Concepts & Properties:
	Recognize equivalent fractions and fractions in lowest terms
	Recognize one-digit factors of a number
	Identify a digit's place value
	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	Find and use the least common multiple
	Order fractions
	Work with numerical factors
	Work with scientific notation
	Work with squares and square roots of numbers
	Work problems involving positive integer exponents
	Work with cubes and cube roots of numbers
	Determine when an expression is undefined
	Apply number properties involving prime factorization
	Apply number properties involving even/odd numbers and factors/multiples
	Apply number properties involving positive/negative numbers
	Apply rules of exponents
	Expressions, Equations, & Inequalities:
	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)
	Solve equations in the form $x + a = b$, where <i>a</i> and <i>b</i> are whole numbers or decimals
	Substitute whole numbers for unknown quantities to evaluate expressions
	Solve one-step equations having integer or decimal answers
	Combine like terms (e.g., $2x + 5x$)
	Evaluate algebraic expressions by substituting integers for unknown quantities

Add and subtract simple algebraic expressions Solve routine first-degree equations Perform straightforward word-to-symbol translations Multiply two binomials Solve real-world problems using first-degree equations Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions) Identify solutions to simple quadratic equations Add, subtract, and multiply polynomials Factor simple quadratics (e.g., the difference of squares and perfect square trinomials) Solve first-degree inequalities that do not require reversing the inequality sign Manipulate expressions, and equations Write expressions, equations, and inequalities for common algebra settings Solve first-degree inequalities that require reversing the inequality sign Solve absolute value equations Graphicat Representations: Identify the location of a point with a positive coordinate on the number line and in the first quadrant Locate points on the number line Locate points on the number line and in the first quadrant Locate points on the coordinate plane Comprehend the concept of length on the number line Exhibit knowledge of slope Identify the graph of a line from points or equations Match linear graphs with theire equations	GEORGIA Core Math 2 Performance Standards	PLAN Mathematics College Readiness Standards
Solve routine first-degree equations Perform straightforward word-to-symbol transilations Multiply two binomials Solve real-world problems using first-degree equations Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions) Identify solutions to simple quadratic equations Add, subtract, and multiply polynomials Factor simple quadratics (e.g., the difference of squares and perfect square trinomials) Solve first-degree inequalities that do not require reversing the inequality sign Manipulate expressions, and inequalities for common algebra settings Solve quadratic equations Write expressions, equations Write expressions, equations Write expressions, equations Solve quadratic equations Solve quadratic equations Identify the location of a point with a positive coordinate on the number line Locate points on the number line and in the first quadrant Locate points on the number line and in the first quadrant Locate points on the concept of length on the number line Determine the solve of a line from points or equations Match linear graphs with their equations Find the midpoint of a linear inequality on the number line Determine the solve of a line from points or equations Match linear graphs with their equations Find the midpoint of a line segment Interpret and use information from graphs in the coordinate plane Match number line graphs with solution sets of linear inequalites Use the distance formula Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point Properties of Plane Figures: Exhibit some knowledge of the angles associated with parallel lines		Add and subtract simple algebraic expressions
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Find the measure of an angle using properties of parallel lines		Exhibit some knowledge of the angles associated with parallel lines
		Find the measure of an angle using properties of parallel lines

GEORGIA Core Math 2		PLAN Mathematics
Performance Standards		College Readiness Standards
		Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
		Use several angle properties to find an unknown angle measure
		Recognize Pythagorean triples
		Use properties of isosceles triangles
		Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
		Use the Pythagorean theorem
		Measurement:
		Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
		Compute the perimeter of polygons when all side lengths are given
		Compute the area of rectangles when whole number dimensions are given
		Compute the area and perimeter of triangles and rectangles in simple problems
		Use geometric formulas when all necessary information is given
		Compute the area of triangles and rectangles when one or more additional simple steps are required
		Compute the area and circumference of circles after identifying necessary information
		Compute the perimeter of simple composite geometric figures with unknown side lengths
		Use relationships involving area, perimeter, and volume of geometric figures to compute another measure
c. Apply and adapt a variety of solve problems.	appropriate strategies to	
d. Monitor and reflect on the proproblem solving.	ocess of mathematical	
MC2P2. Students will reason and arguments.	evaluate mathematical	
a. Recognize reasoning and pro aspects of mathematics.	oof as fundamental	
b. Make and investigate mather	matical conjectures.	
c. Develop and evaluate mathe proofs.	matical arguments and	
d. Select and use various types of proof.	of reasoning and methods	
MC2P3. Students will communication	ate mathematically.	
a. Organize and consolidate the through communication.	eir mathematical thinking	
b. Communicate their mathema and clearly to peers, teachers	tical thinking coherently s, and others.	
c. Analyze and evaluate the ma strategies of others.	thematical thinking and	

GE Pe	EORGIA Core Math 2 rformance Standards	PLAN Mathematics College Readiness Standards
d.	Use the language of mathematics to express	Expressions, Equations, & Inequalities:
	mathematical ideas precisely.	Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
MC ma	2P4. Students will make connections among thematical ideas and to other disciplines.	
a.	Recognize and use connections among mathematical ideas.	
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	
C.	Recognize and apply mathematics in contexts outside of mathematics.	
MC wa	2P5. Students will represent mathematics in multiple ys.	
a.	Create and use representations to organize, record,	Probability, Statistics, & Data Analysis:
	and communicate mathematical ideas.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
b.	Select, apply, and translate among mathematical	Probability, Statistics, & Data Analysis:
	representations to solve problems.	Interpret and use information from figures, tables, and graphs
C.	Use representations to model and interpret physical,	Probability, Statistics, & Data Analysis:
	social, and mathematical phenomena.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
		Manipulate data from tables and graphs
		Interpret and use information from figures, tables, and graphs
		Expressions, Equations, & Inequalities:
		Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
		Write expressions, equations, and inequalities for common algebra settings
M	ATH READING CONTENT	
Stu	idents will enhance reading in all curriculum areas by:	
a.	Reading in all curriculum areas	
	• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas	
	 Read both informational and fictional texts in a variety of genres and modes of discourse 	
	Read technical texts related to various subject areas	

GE Pe	EORGIA Core Math 2 rformance Standards	PLAN Mathematics College Readiness Standards
b.	Discussing books	
	 Discuss messages and themes from books in all subject areas. 	
	 Respond to a variety of texts in multiple modes of discourse. 	
	 Relate messages and themes from one subject area to messages and themes in another area. 	
	• Evaluate the merit of texts in every subject discipline.	
	 Examine author's purpose in writing. 	
	 Recognize the features of disciplinary texts. 	
C.	Building vocabulary knowledge	
	 Demonstrate an understanding of contextual vocabulary in various subjects. 	
	 Use content vocabulary in writing and speaking. 	
	• Explore understanding of new words found in subject area texts.	
d.	Establishing context	
	 Explore life experiences related to subject area content. 	
	 Discuss in both writing and speaking how certain words are subject area related. 	
	 Determine strategies for finding content and contextual meaning for unknown words. 	



GEORGIA Core Math 3 Performance Standards

ACT Mathematics College Readiness Standards

AL	GEBRA	
Stu fun app pro	idents will investigate piecewise and exponential ctions from numerical, analytical and graphical proaches, focusing on the use of these functions in blem-solving situations.	
MC fun fun	3A1. Students will investigate step and piecewise ctions, including greatest integer and absolute value ctions.	
a.	Write absolute value functions as piecewise functions.	Expressions, Equations, & Inequalities:
		Write expressions, equations, and inequalities for common algebra settings
b.	Investigate and explain characteristics of a variety of	Graphical Representations:
	piecewise functions including domain, range, vertex, axis of symmetry, zeros, intercepts, extrema, points of discontinuity, intervals over which the function is constant, intervals of increase and decrease, and rates of change.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
C.	Solve absolute value equations and inequalities	Expressions, Equations, & Inequalities:
	analytically, graphically, and by using appropriate	Solve absolute value equations
	technology.	Solve simple absolute value inequalities
MC	3A2. Students will explore exponential functions.	
a.	Extend properties of exponents to include all integer	Numbers: Concepts & Properties:
	exponents.	Apply rules of exponents
b.	Investigate and explain characteristics of exponential	Graphical Representations:
	functions, including domain and range, asymptotes, zeros, intercepts, intervals of increase and decrease, rates of change, and end behavior.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
C.	Graph functions as transformations of $f(x) = a^{x}$.	Graphical Representations:
		Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
d.	Solve simple exponential equations and inequalities analytically, graphically, and by using appropriate technology.	
e.	Understand and use basic exponential functions as	Expressions, Equations, & Inequalities:
	models of real phenomena.	Write expressions that require planning and/or manipulating to accurately model a situation
f.	Understand and recognize geometric sequences as	Numbers: Concepts & Properties:
	exponential functions with domains that are sets of whole numbers.	Exhibit knowledge of logarithms and geometric sequences
g.	Interpret the constant ratio in a geometric sequence as	Numbers: Concepts & Properties:
	the base of the associated exponential function.	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers

GEORGIA Core Math 3 Performance Standards

ACT Mathematics College Readiness Standards

GEOMETRY	
Students will explore right triangles and right triangular trigonometry.	
MC3G1. Students will identify and use special right triangles.	
a. Determine the lengths of sides of 30°-60°-90° triangles.	Properties of Plane Figures:
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
b. Determine the lengths of sides of 45°-45°-90° triangles.	Properties of Plane Figures:
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
MC3G2. Students will define and apply sine, cosine, and tangent ratios to right triangles.	
a. Discover the relationship of the trigonometric ratios for	Properties of Plane Figures:
similar triangles.	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
	Functions:
	Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
b. Explain the relationship between the trigonometric	Functions:
ratios of complementary angles.	Use trigonometric concepts and basic identities to solve problems
c. Solve application problems using the trigonometric	Functions:
	Apply basic trigonometric ratios to solve right-triangle problems
DATA ANALYSIS AND PROBABILITY	
Students will demonstrate understanding of data analysis	
Students will organize, represent, investigate, interpret, and	
make inferences from data. Students will use regression to	
MC3D1, Using sample data, students will make informal	
inferences about population means and standard deviations.	
a. Pose a question and collect sample data from at least two different populations.	
b. Understand and calculate the means and standard	Probability, Statistics, & Data Analysis:
deviations of sets of data.	Calculate the average of a list of positive whole numbers
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Perform computations on data from tables and graphs
	Calculate the average, given the frequency counts of all the data values
c. Use means and standard deviations to compare data	Probability, Statistics, & Data Analysis:
Sets.	Analyze and draw conclusions based on information from figures, tables, and graphs

GEORGIA Core Math Performance Standar	3 ·ds	ACT Mathematics College Readiness Standards
d. Compare the means	and standard deviations of	Probability, Statistics, & Data Analysis:
random samples with parameters. Observe vary from one sample distribution of the sar than the population d	the corresponding population that the different sample means to the next. Observe that the mple means has less variability listribution.	Analyze and draw conclusions based on information from figures, tables, and graphs
MC3D2. Students will det quantify the association b	termine an algebraic model to between two quantitative variables.	
a. Gather and plot data	that can be modeled with linear	Probability, Statistics, & Data Analysis:
functions.		Translate from one representation of data to another (e.g., a bar graph to a circle graph)
		Graphical Representations:
		Locate points in the coordinate plane
b. Examine the issues of	of curve fitting by finding good	Probability, Statistics, & Data Analysis:
median-median line a	and "eyeballing."	Perform computations on data from tables and graphs
		Interpret and use information from figures, tables, and graphs
		Expressions, Equations, & Inequalities:
		Write expressions that require planning and/or manipulating to accurately model a situation
		Graphical Representations:
		Interpret and use information from graphs in the coordinate plane
c. Understand and appl regression for curve f technology.	y the processes of linear fitting using appropriate	
PROCESS STANDA	RDS	
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.		
MC3P1. Students will sol technology)	ve problems (using appropriate	
a. Build new mathemati solving	cal knowledge through problem	
b. Solve problems that a	arise in mathematics and in other	Basic Operations & Applications:
contexts.		Perform one-operation computation with whole numbers and decimals
		Solve problems in one or two steps using whole numbers
		Perform common conversions (e.g., inches to feet or hours to minutes)
		Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent
		Solve some routine two-step arithmetic problems
		Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average

GEORGIA Core Math 3	ACT Mathematics
Performance Standards	College Readiness Standards
	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)
	Solve word problems containing several rates, proportions, or percentages
	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)
	Probability, Statistics, & Data Analysis:
	Calculate the average of a list of positive whole numbers
	Perform a single computation using information from a table or chart
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Read tables and graphs
	Perform computations on data from tables and graphs
	Use the relationship between the probability of an event and the probability of its complement
	Calculate the missing data value, given the average and all data values but one
	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Determine the probability of a simple event
	Exhibit knowledge of simple counting techniques
	Calculate the average, given the frequency counts of all the data values
	Manipulate data from tables and graphs
	Compute straightforward probabilities for common situations
	Use Venn diagrams in counting
	Calculate or use a weighted average
	Interpret and use information from figures, tables, and graphs
	Apply counting techniques
	Compute a probability when the event and/or sample space are not given or obvious
	Distinguish between mean, median, and mode for a list of numbers
	Analyze and draw conclusions based on information from figures, tables, and graphs
	Exhibit knowledge of conditional and joint probability
	Numbers: Concepts & Properties:
	Recognize equivalent fractions and fractions in lowest terms
	Recognize one-digit factors of a number

GEORGIA Core Math 3 Performance Standards	ACT Mathematics College Readiness Standards
	Identify a digit's place value
	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	Find and use the least common multiple
	Order fractions
	Work with numerical factors
	Work with scientific notation
	Work with squares and square roots of numbers
	Work problems involving positive integer exponents
	Work with cubes and cube roots of numbers
	Determine when an expression is undefined
	Exhibit some knowledge of the complex numbers
	Apply number properties involving prime factorization
	Apply number properties involving even/odd numbers and factors/multiples
	Apply number properties involving positive/negative numbers
	Apply rules of exponents
	Multiply two complex numbers
	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
	Exhibit knowledge of logarithms and geometric sequences
	Apply properties of complex numbers
	Expressions, Equations, & Inequalities:
	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)
	Solve equations in the form $x + a = b$, where <i>a</i> and <i>b</i> are whole numbers or decimals
	Substitute whole numbers for unknown quantities to evaluate expressions
	Solve one-step equations having integer or decimal answers
	Combine like terms (e.g., $2x + 5x$)
	Evaluate algebraic expressions by substituting integers for unknown quantities
	Add and subtract simple algebraic expressions
	Solve routine first-degree equations
	Perform straightforward word-to-symbol translations
	Multiply two binomials
	Solve real-world problems using first-degree equations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)

GEORGIA Core Math 3 Performance Standards	ACT Mathematics College Readiness Standards
	Identify solutions to simple quadratic equations
	Add, subtract, and multiply polynomials
	Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)
	Solve first-degree inequalities that do not require reversing the inequality sign
	Manipulate expressions and equations
	Write expressions, equations, and inequalities for common algebra settings
	Solve linear inequalities that require reversing the inequality sign
	Solve absolute value equations
	Solve quadratic equations
	Find solutions to systems of linear equations
	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Solve simple absolute value inequalities
	Graphical Representations:
	Identify the location of a point with a positive coordinate on the number line
	Locate points on the number line and in the first quadrant
	Locate points in the coordinate plane
	Comprehend the concept of length on the number line
	Exhibit knowledge of slope
	Identify the graph of a linear inequality on the number line
	Determine the slope of a line from points or equations
	Match linear graphs with their equations
	Find the midpoint of a line segment
	Interpret and use information from graphs in the coordinate plane
	Match number line graphs with solution sets of linear inequalities
	Use the distance formula
	Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point
	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)
	Match number line graphs with solution sets of simple quadratic inequalities
	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
	Solve problems integrating multiple algebraic and/or geometric concepts

GEORGIA Core Math 3 Performance Standards	ACT Mathematics College Readiness Standards
	Analyze and draw conclusions based on information from graphs in the coordinate plane
	Properties of Plane Figures:
	Exhibit some knowledge of the angles associated with parallel lines
	Find the measure of an angle using properties of parallel lines
	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
	Use several angle properties to find an unknown angle measure
	Recognize Pythagorean triples
	Use properties of isosceles triangles
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
	Use the Pythagorean theorem
	Draw conclusions based on a set of conditions
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
	Use relationships among angles, arcs, and distances in a circle
	Measurement:
	Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
	Compute the perimeter of polygons when all side lengths are given
	Compute the area of rectangles when whole number dimensions are given
	Compute the area and perimeter of triangles and rectangles in simple problems
	Use geometric formulas when all necessary information is given
	Compute the area of triangles and rectangles when one or more additional simple steps are required
	Compute the area and circumference of circles after identifying necessary information
	Compute the perimeter of simple composite geometric figures with unknown side lengths
	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure
	Use scale factors to determine the magnitude of a size change
	Compute the area of composite geometric figures when planning or visualization is required
	Functions:
	Evaluate quadratic functions, expressed in function notation, at integer values

GEORGIA Core Math 3 Performance Standards	ACT Mathematics College Readiness Standards
	Evaluate polynomial functions, expressed in function notation, at integer values
	Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
	Evaluate composite functions at integer values
	Apply basic trigonometric ratios to solve right-triangle problems
	Write an expression for the composite of two simple functions
	Use trigonometric concepts and basic identities to solve problems
	Exhibit knowledge of unit circle trigonometry
	Match graphs of basic trigonometric functions with their equations
c. Apply and adapt a variety of appropriate strategies to	Expressions, Equations, & Inequalities:
solve problems.	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Graphical Representations:
	Solve problems integrating multiple algebraic and/or geometric concepts
	Properties of Plane Figures:
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
 Monitor and reflect on the process of mathematical problem solving. 	
MC3P2. Students will reason and evaluate mathematical arguments	
a. Recognize reasoning and proof as fundamental aspects of mathematics.	
b. Make and investigate mathematical conjectures.	Probability, Statistics, & Data Analysis:
	Analyze and draw conclusions based on information from figures, tables, and graphs
	Numbers: Concepts & Properties:
	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
	Graphical Representations:
	Analyze and draw conclusions based on information from graphs in the coordinate plane
	Properties of Flame Figures.
c Develop and evaluate mathematical arguments and	Probability Statistics & Data Analysis
proofs.	Analyze and draw conclusions based on information from figures, tables, and graphs

GE Pe	EORGIA Core Math 3 rformance Standards	ACT Mathematics College Readiness Standards
		Numbers: Concepts & Properties:
		Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
		Graphical Representations: Analyze and draw conclusions based on information from graphs in the coordinate plane Properties of Plane Figures:
		Draw conclusions based on a set of conditions
d.	Select and use various types of reasoning and methods	Numbers: Concepts & Properties:
	of proof.	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
		Properties of Plane Figures:
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
MC3P3. Students will communicate mathematically.		
a.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
C.	Analyze and evaluate the mathematical thinking and strategies of others.	
d.	Use the language of mathematics to express	Expressions, Equations, & Inequalities:
	mathematical ideas precisely.	Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
		Write expressions that require planning and/or manipulating to accurately model a situation
		Write equations and inequalities that require planning, manipulating, and/or solving
MC ma	3P4. Students will make connections among the analysis of the states and to other disciplines.	
a.	Recognize and use connections among mathematical	Properties of Plane Figures:
	Ideas.	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole	
C.	Recognize and apply mathematics in contexts outside of mathematics.	

GEORGIA Core Ma Performance Stan	ath 3 dards	ACT Mathematics College Readiness Standards
MC3P5. Students will represent mathematics in multiple ways.		
a. Create and use re	epresentations to organize, record,	Probability, Statistics, & Data Analysis:
and communicate	e mathematical ideas.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
b. Select, apply, and	d translate among mathematical	Basic Operations & Applications:
representations to	representations to solve problems.	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings) Probability Statistics & Data Analysis:
		Interpret and use information from figures, tables, and graphs
		Analyze and draw conclusions based on information from figures, tables, and graphs
		Expressions, Equations, & Inequalities:
		Write equations and inequalities that require planning, manipulating, and/or solving
		Graphical Representations:
		Solve problems integrating multiple algebraic and/or geometric concepts
		Properties of Plane Figures:
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
c. Use representation	ons to model and interpret physical,	Probability, Statistics, & Data Analysis:
social, and mathe	social, and mathematical phenomena.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
		Manipulate data from tables and graphs
		Interpret and use information from figures, tables, and graphs
		Analyze and draw conclusions based on information from figures, tables, and graphs
		Expressions, Equations, & Inequalities:
		Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
		Write expressions, equations, and inequalities for common algebra settings
		Write expressions that require planning and/or manipulating to accurately model a situation
		Write equations and inequalities that require planning, manipulating, and/or solving
		Graphical Representations:
		Analyze and draw conclusions based on information from graphs in the coordinate plane

GI P€	EORGIA Core Math 3 erformance Standards	ACT Mathematics College Readiness Standards
MATH READING CONTENT		
St	udents will enhance reading in all curriculum areas:	
a.	Reading in all curriculum areas	
	• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas	
	 Read both informational and fictional texts in a variety of genres and modes of discourse 	
	Read technical texts related to various subject areas	
b.	Discussing books	
	 Discuss messages and themes from books in all subject areas. 	
	 Respond to a variety of texts in multiple modes of discourse. 	
	 Relate messages and themes from one subject area to messages and themes in another area. 	
	• Evaluate the merit of texts in every subject discipline.	
	 Examine author's purpose in writing. 	
	 Recognize the features of disciplinary texts. 	
C.	Building vocabulary knowledge	
	 Demonstrate an understanding of contextual vocabulary in various subjects. 	
	 Use content vocabulary in writing and speaking. 	
	• Explore understanding of new words found in subject area texts.	
d.	Establishing context	
	 Explore life experiences related to subject area content. 	
	 Discuss in both writing and speaking how certain words are subject area related. 	
	 Determine strategies for finding content and contextual meaning for unknown words 	

GE Sta	ORGIA Core Math 3 andards	ACT's WorkKeys Applied Mathematics Level Skills
AL	GEBRA	
Stu fun app pro	dents will investigate piecewise and exponential ctions from numerical, analytical and graphical proaches, focusing on the use of these functions in blem-solving situations.	
MC3A1. Students will investigate step and piecewise functions, including greatest integer and absolute value functions.		
a.	Write absolute value functions as piecewise functions.	
b.	Investigate and explain characteristics of a variety of piecewise functions including domain, range, vertex, axis of symmetry, zeros, intercepts, extrema, points of discontinuity, intervals over which the function is constant, intervals of increase and decrease, and rates of change.	
C.	Solve absolute value equations and inequalities analytically, graphically, and by using appropriate technology.	
MC	3A2. Students will explore exponential functions.	
a.	Extend properties of exponents to include all integer exponents.	
b.	Investigate and explain characteristics of exponential functions, including domain and range, asymptotes, zeros, intercepts, intervals of increase and decrease, rates of change, and end behavior.	
C.	Graph functions as transformations of $f(x) = a^x$.	
d.	Solve simple exponential equations and inequalities analytically, graphically, and by using appropriate technology.	Calculate perimeters and areas of basic shapes (rectangles and circles) Rearrange a formula before solving a problem Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
		Find the volume of rectangular solids
		or cones
e.	Understand and <mark>use basic exponential functions as</mark> models of real phenomena.	Decide what information, calculations, or unit conversions to use to solve the problem
f.	Understand and recognize geometric sequences as exponential functions with domains that are sets of whole numbers.	
g.	Interpret the constant ratio in a geometric sequence as the base of the associated exponential function.	
GE	OMETRY	
Stu trig	dents will explore right triangles and right triangular onometry.	
MC tria	3G1. Students will identify and use special right ngles.	
a.	Determine the lengths of sides of 30°-60°-90° triangles.	
b.	Determine the lengths of sides of 45°-45°-90° triangles.	

GEORGIA Core Math 3 Standards	ACT's WorkKeys Applied Mathematics Level Skills
MC3G2. Students will define and apply sine, cosine, and tangent ratios to right triangles.	
a. Discover the relationship of the trigonometric ratios for similar triangles.	
b. Explain the relationship between the trigonometric ratios of complementary angles.	
c. Solve application problems using the trigonometric ratios.	
DATA ANALYSIS AND PROBABILITY	
Students will demonstrate understanding of data analysis by posing questions to be answered by collecting data. Students will organize, represent, investigate, interpret, and make inferences from data. Students will use regression to analyze data, and to make inferences.	
MC3D1. Using sample data, students will make informal inferences about population means and standard deviations.	
a. Pose a question and collect sample data from at least two different populations.	
b. Understand and calculate the means and standard deviations of sets of data.	
c. Use means and standard deviations to compare data sets.	
d. Compare the means and standard deviations of random samples with the corresponding population parameters. Observe that the different sample means vary from one sample to the next. Observe that the distribution of the sample means has less variability than the population distribution.	
MC3D2. Students will determine an algebraic model to quantify the association between two quantitative variables.	
a. Gather and plot data that can be modeled with linear functions.	
 Examine the issues of curve fitting by finding good linear fits to data using simple methods such as the median-median line and "eyeballing." 	
c. Understand and apply the processes of linear regression for curve fitting using appropriate technology.	
PROCESS STANDARDS	
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.	
MC3P1. Students will solve problems (using appropriate technology)	
a. Build new mathematical knowledge through problem solving	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages

GEORGIA Core Math 3 Standards	ACT's WorkKeys Applied Mathematics Level Skills
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
	Put the information in the right order before performing calculations
	Decide what information, calculations, or unit conversions to use to solve the problem
	Look up a formula and perform single-step conversions within or between systems of measurement
	Find the best deal using one- and two-step calculations and then comparing results
	Calculate perimeters and areas of basic shapes (rectangles and circles)
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem
	Use two formulas to change from one unit to another within the same system of measurement
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
	Find the volume of rectangular solids
	Calculate multiple rates
	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
	Calculate multiple areas and volumes of spheres, cylinders, or cones
	Set up and manipulate complex ratios or proportions
	Find the best deal when there are several choices
 Solve problems that arise in mathematics and in other contexts. 	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
	Put the information in the right order before performing calculations
	Decide what information, calculations, or unit conversions to use to solve the problem
	Look up a formula and perform single-step conversions within or between systems of measurement
	Find the best deal using one- and two-step calculations and then comparing results
	Calculate perimeters and areas of basic shapes (rectangles and circles)
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem

GEORGIA Core Math 3 Standards	ACT's WorkKeys Applied Mathematics Level Skills
	Use two formulas to change from one unit to another within the same system of measurement
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
	Find the volume of rectangular solids
	Calculate multiple rates
	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
	Calculate multiple areas and volumes of spheres, cylinders, or cones
	Set up and manipulate complex ratios or proportions
	Find the best deal when there are several choices
 Apply and adapt a variety of appropriate strategies to solve problems. 	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
	Put the information in the right order before performing calculations
	Decide what information, calculations, or unit conversions to use to solve the problem
	Look up a formula and perform single-step conversions within or between systems of measurement
	Find the best deal using one- and two-step calculations and then comparing results
	Calculate perimeters and areas of basic shapes (rectangles and circles)
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem
	Use two formulas to change from one unit to another within the same system of measurement
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
	Find the volume of rectangular solids
	Calculate multiple rates
	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
	Calculate multiple areas and volumes of spheres, cylinders, or cones
	Set up and manipulate complex ratios or proportions

GE Sta	EORGIA Core Math 3 andards	ACT's WorkKeys Applied Mathematics Level Skills
		Find the best deal when there are several choices
d.	Monitor and reflect on the process of mathematical	Find mistakes in items that belong at Levels 3, 4, and 5
	problem solving.	Find mistakes in Level 6 items
MC arg	3P2. Students will reason and evaluate mathematical juments	
a.	Recognize reasoning and proof as fundamental aspects of mathematics.	
b.	Make and investigate mathematical conjectures.	Rearrange a formula before solving a problem
		Solve problems that include nonlinear functions and/or that involve more than one unknown
		Set up and manipulate complex ratios or proportions
C.	Develop and evaluate mathematical arguments and proofs.	
d.	Select and use various types of reasoning and methods of proof.	
MC	3P3. Students will communicate mathematically.	
a.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
C.	Analyze and evaluate the mathematical thinking and	Find mistakes in items that belong at Levels 3, 4, and 5
	strategies of others.	Find mistakes in Level 6 items
		Find the best deal when there are several choices
d.	Use the language of mathematics to express mathematical ideas precisely.	
MC3P4. Students will make connections among mathematical ideas and to other disciplines.		
a.	Recognize and use connections among mathematical ideas.	
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole	
C.	Recognize and apply mathematics in contexts outside of mathematics.	Decide what information, calculations, or unit conversions to use to solve the problem
MC wa	3P5. Students will represent mathematics in multiple ys.	
a.	Create and use representations to organize, record, and communicate mathematical ideas.	
b.	Select, apply, and translate among mathematical representations to solve problems.	Put the information in the right order before performing calculations
		Decide what information, calculations, or unit conversions to use to solve the problem
C.	Use representations to model and interpret physical, social, and mathematical phenomena.	

GI St	EORGIA Core Math 3 andards	ACT's WorkKeys Applied Mathematics Level Skills
M	ATH READING CONTENT	
Stu	dents will enhance reading in all curriculum areas by:	
a.	Reading in all curriculum areas	
	• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas	
	 Read both informational and fictional texts in a variety of genres and modes of discourse 	
	Read technical texts related to various subject areas	
b.	Discussing books	
	 Discuss messages and themes from books in all subject areas. 	
	 Respond to a variety of texts in multiple modes of discourse. 	
	 Relate messages and themes from one subject area to messages and themes in another area. 	
	• Evaluate the merit of texts in every subject discipline.	
	 Examine author's purpose in writing. 	
	 Recognize the features of disciplinary texts. 	
C.	Building vocabulary knowledge	
	 Demonstrate an understanding of contextual vocabulary in various subjects. 	
	 Use content vocabulary in writing and speaking. 	
	 Explore understanding of new words found in subject area texts. 	
d.	Establishing context	
	 Explore life experiences related to subject area content. 	
	 Discuss in both writing and speaking how certain words are subject area related. 	
	 Determine strategies for finding content and contextual meaning for unknown words 	

GEORGIA Core Math 3 Performance Standards

ACT Mathematics College Readiness Standards

AL	ALGEBRA		
Stu fun app pro	Students will investigate piecewise and exponential functions from numerical, analytical and graphical approaches, focusing on the use of these functions in problem-solving situations.		
MC3A1. Students will investigate step and piecewise functions, including greatest integer and absolute value functions.			
a.	Write absolute value functions as piecewise functions.	Expressions, Equations, & Inequalities:	
		Write expressions, equations, and inequalities for common algebra settings	
b.	Investigate and explain characteristics of a variety of	Graphical Representations:	
	piecewise functions including domain, range, vertex, axis of symmetry, zeros, intercepts, extrema, points of discontinuity, intervals over which the function is constant, intervals of increase and decrease, and rates of change.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
C.	Solve absolute value equations and inequalities	Expressions, Equations, & Inequalities:	
	analytically, graphically, and by using appropriate	Solve absolute value equations	
	technology.	Solve simple absolute value inequalities	
MC3A2. Students will explore exponential functions.			
a.	Extend properties of exponents to include all integer	Numbers: Concepts & Properties:	
	exponents.	Apply rules of exponents	
b.	Investigate and explain characteristics of exponential	Graphical Representations:	
	functions, including domain and range, asymptotes, zeros, intercepts, intervals of increase and decrease, rates of change, and end behavior.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
C.	Graph functions as transformations of $f(x) = a^{x}$.	Graphical Representations:	
		Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
d.	Solve simple exponential equations and inequalities analytically, graphically, and by using appropriate technology.		
e.	Understand and use basic exponential functions as	Expressions, Equations, & Inequalities:	
	models of real phenomena.	Write expressions that require planning and/or manipulating to accurately model a situation	
f.	Understand and recognize geometric sequences as	Numbers: Concepts & Properties:	
	exponential functions with domains that are sets of whole numbers.	Exhibit knowledge of logarithms and geometric sequences	
g.	Interpret the constant ratio in a geometric sequence as	Numbers: Concepts & Properties:	
	the base of the associated exponential function.	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers	

GEORGIA Core Math 3 Performance Standards

ACT Mathematics College Readiness Standards

GEOMETRY	
Students will explore right triangles and right triangular trigonometry.	
MC3G1. Students will identify and use special right triangles.	
a. Determine the lengths of sides of 30°-60°-90° triangles.	Properties of Plane Figures:
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
b. Determine the lengths of sides of 45°-45°-90° triangles.	Properties of Plane Figures:
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
MC3G2. Students will define and apply sine, cosine, and tangent ratios to right triangles.	
a. Discover the relationship of the trigonometric ratios for	Properties of Plane Figures:
similar triangles.	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
	Functions:
	Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
b. Explain the relationship between the trigonometric	Functions:
ratios of complementary angles.	Use trigonometric concepts and basic identities to solve problems
c. Solve application problems using the trigonometric	Functions:
	Apply basic trigonometric ratios to solve right-triangle problems
DATA ANALYSIS AND PROBABILITY	
Students will demonstrate understanding of data analysis	
Students will organize, represent, investigate, interpret, and	
make inferences from data. Students will use regression to analyze data, and to make inferences	
MC3D1. Using sample data, students will make informal	
deviations.	
a. Pose a question and collect sample data from at least two different populations.	
b. Understand and calculate the means and standard	Probability, Statistics, & Data Analysis:
deviations of sets of data.	Calculate the average of a list of positive whole numbers
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Perform computations on data from tables and graphs
	Calculate the average, given the frequency counts of all the data values
c. Use means and standard deviations to compare data	Probability, Statistics, & Data Analysis:
	Analyze and draw conclusions based on information from figures, tables, and graphs

GEORGIA Core Math 3 Performance Standards		ACT Mathematics College Readiness Standards
d.	Compare the means and standard deviations of random samples with the corresponding population	Probability, Statistics, & Data Analysis:
	parameters. Observe that the different sample means vary from one sample to the next. Observe that the distribution of the sample means has less variability than the population distribution.	Analyze and draw conclusions based on information from figures, tables, and graphs
MC qua	3D2. Students will determine an algebraic model to antify the association between two quantitative variables.	
a.	Gather and plot data that can be modeled with linear	Probability, Statistics, & Data Analysis:
	functions.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
		Graphical Representations:
		Locate points in the coordinate plane
b.	Examine the issues of curve fitting by finding good	Probability, Statistics, & Data Analysis:
	median-median line and "eyeballing."	Perform computations on data from tables and graphs
		Interpret and use information from figures, tables, and graphs
		Expressions, Equations, & Inequalities:
		Write expressions that require planning and/or manipulating to accurately model a situation
		Graphical Representations:
		Interpret and use information from graphs in the coordinate plane
C.	Understand and apply the processes of linear regression for curve fitting using appropriate technology.	
PF	ROCESS STANDARDS	
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.		
MC tec	3P1. Students will solve problems (using appropriate hnology)	
а.	Build new mathematical knowledge through problem solving	
b.	Solve problems that arise in mathematics and in other	Basic Operations & Applications:
	CONTEXTS.	Perform one-operation computation with whole numbers and decimals
		Solve problems in one or two steps using whole numbers
		Perform common conversions (e.g., inches to feet or hours to minutes)
		Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent
		Solve some routine two-step arithmetic problems
		Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average

GEORGIA Core Math 3	ACT Mathematics
Performance Standards	College Readiness Standards
	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)
	Solve word problems containing several rates, proportions, or percentages
	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)
	Probability, Statistics, & Data Analysis:
	Calculate the average of a list of positive whole numbers
	Perform a single computation using information from a table or chart
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Read tables and graphs
	Perform computations on data from tables and graphs
	Use the relationship between the probability of an event and the probability of its complement
	Calculate the missing data value, given the average and all data values but one
	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Determine the probability of a simple event
	Exhibit knowledge of simple counting techniques
	Calculate the average, given the frequency counts of all the data values
	Manipulate data from tables and graphs
	Compute straightforward probabilities for common situations
	Use Venn diagrams in counting
	Calculate or use a weighted average
	Interpret and use information from figures, tables, and graphs
	Apply counting techniques
	Compute a probability when the event and/or sample space are not given or obvious
	Distinguish between mean, median, and mode for a list of numbers
	Analyze and draw conclusions based on information from figures, tables, and graphs
	Exhibit knowledge of conditional and joint probability
	Numbers: Concepts & Properties:
	Recognize equivalent fractions and fractions in lowest terms
	Recognize one-digit factors of a number

GEORGIA Core Math 3 Performance Standards	ACT Mathematics College Readiness Standards
	Identify a digit's place value
	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	Find and use the least common multiple
	Order fractions
	Work with numerical factors
	Work with scientific notation
	Work with squares and square roots of numbers
	Work problems involving positive integer exponents
	Work with cubes and cube roots of numbers
	Determine when an expression is undefined
	Exhibit some knowledge of the complex numbers
	Apply number properties involving prime factorization
	Apply number properties involving even/odd numbers and factors/multiples
	Apply number properties involving positive/negative numbers
	Apply rules of exponents
	Multiply two complex numbers
	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
	Exhibit knowledge of logarithms and geometric sequences
	Apply properties of complex numbers
	Expressions, Equations, & Inequalities:
	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)
	Solve equations in the form $x + a = b$, where <i>a</i> and <i>b</i> are whole numbers or decimals
	Substitute whole numbers for unknown quantities to evaluate expressions
	Solve one-step equations having integer or decimal answers
	Combine like terms (e.g., $2x + 5x$)
	Evaluate algebraic expressions by substituting integers for unknown quantities
	Add and subtract simple algebraic expressions
	Solve routine first-degree equations
	Perform straightforward word-to-symbol translations
	Multiply two binomials
	Solve real-world problems using first-degree equations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)

GEORGIA Core Math 3 Performance Standards	ACT Mathematics College Readiness Standards
	Identify solutions to simple quadratic equations
	Add, subtract, and multiply polynomials
	Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)
	Solve first-degree inequalities that do not require reversing the inequality sign
	Manipulate expressions and equations
	Write expressions, equations, and inequalities for common algebra settings
	Solve linear inequalities that require reversing the inequality sign
	Solve absolute value equations
	Solve quadratic equations
	Find solutions to systems of linear equations
	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Solve simple absolute value inequalities
	Graphical Representations:
	Identify the location of a point with a positive coordinate on the number line
	Locate points on the number line and in the first quadrant
	Locate points in the coordinate plane
	Comprehend the concept of length on the number line
	Exhibit knowledge of slope
	Identify the graph of a linear inequality on the number line
	Determine the slope of a line from points or equations
	Match linear graphs with their equations
	Find the midpoint of a line segment
	Interpret and use information from graphs in the coordinate plane
	Match number line graphs with solution sets of linear inequalities
	Use the distance formula
	Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point
	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)
	Match number line graphs with solution sets of simple quadratic inequalities
	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
	Solve problems integrating multiple algebraic and/or geometric concepts

GEORGIA Core Math 3 Performance Standards	ACT Mathematics College Readiness Standards
	Analyze and draw conclusions based on information from graphs in the coordinate plane
	Properties of Plane Figures:
	Exhibit some knowledge of the angles associated with parallel lines
	Find the measure of an angle using properties of parallel lines
	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
	Use several angle properties to find an unknown angle measure
	Recognize Pythagorean triples
	Use properties of isosceles triangles
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
	Use the Pythagorean theorem
	Draw conclusions based on a set of conditions
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
	Use relationships among angles, arcs, and distances in a circle
	Measurement:
	Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
	Compute the perimeter of polygons when all side lengths are given
	Compute the area of rectangles when whole number dimensions are given
	Compute the area and perimeter of triangles and rectangles in simple problems
	Use geometric formulas when all necessary information is given
	Compute the area of triangles and rectangles when one or more additional simple steps are required
	Compute the area and circumference of circles after identifying necessary information
	Compute the perimeter of simple composite geometric figures with unknown side lengths
	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure
	Use scale factors to determine the magnitude of a size change
	Compute the area of composite geometric figures when planning or visualization is required
	Functions:
	Evaluate quadratic functions, expressed in function notation, at integer values

GEORGIA Core Math 3 Performance Standards	ACT Mathematics College Readiness Standards	
	Evaluate polynomial functions, expressed in function notation, at integer values	
	Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths	
	Evaluate composite functions at integer values	
	Apply basic trigonometric ratios to solve right-triangle problems	
	Write an expression for the composite of two simple functions	
	Use trigonometric concepts and basic identities to solve problems	
	Exhibit knowledge of unit circle trigonometry	
	Match graphs of basic trigonometric functions with their equations	
c. Apply and adapt a variety of appropriate strategies to	Expressions, Equations, & Inequalities:	
solve problems.	Write expressions that require planning and/or manipulating to accurately model a situation	
	Write equations and inequalities that require planning, manipulating, and/or solving	
	Graphical Representations:	
	Solve problems integrating multiple algebraic and/or geometric concepts	
	Properties of Plane Figures:	
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas	
 Monitor and reflect on the process of mathematical problem solving. 		
MC3P2. Students will reason and evaluate mathematical arguments		
a. Recognize reasoning and proof as fundamental aspects of mathematics.		
b. Make and investigate mathematical conjectures.	Probability, Statistics, & Data Analysis:	
	Analyze and draw conclusions based on information from figures, tables, and graphs	
	Numbers: Concepts & Properties:	
	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers	
	Graphical Representations:	
	Analyze and draw conclusions based on information from graphs in the coordinate plane Properties of Plane Figures:	
	Draw conclusions based on a set of conditions	

GEORGIA Core Math 3 Performance Standards		ACT Mathematics College Readiness Standards	
C.	Develop and evaluate mathematical arguments and	Probability, Statistics, & Data Analysis:	
	proofs.	Analyze and draw conclusions based on information from figures, tables, and graphs	
		Numbers: Concepts & Properties:	
		Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers	
		Graphical Representations:	
		Analyze and draw conclusions based on information from graphs in the coordinate plane	
		Draw conclusions based on a set of conditions	
d	Select and use various types of reasoning and methods	Numbers: Concepts & Properties:	
G.	of proof.	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers	
		Properties of Plane Figures:	
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas	
МС	MC3P3. Students will communicate mathematically.		
a.	Organize and consolidate their mathematical thinking through communication.		
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.		
C.	Analyze and evaluate the mathematical thinking and strategies of others.		
d.	Use the language of mathematics to express	Expressions, Equations, & Inequalities:	
	mathematical ideas precisely.	Perform straightforward word-to-symbol translations	
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)	
		Write expressions that require planning and/or manipulating to accurately model a situation	
		Write equations and inequalities that require planning, manipulating, and/or solving	
MC3P4. Students will make connections among mathematical ideas and to other disciplines.			
a.	Recognize and use connections among mathematical	Properties of Plane Figures:	
	Ideas.	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas	
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole		
C.	Recognize and apply mathematics in contexts outside of mathematics.		

GEORGIA Core Math 3 Performance Standards		ACT Mathematics College Readiness Standards
MC3P5. Students will represent mathematics in multiple ways.		
a. Create and use re	Create and use representations to organize, record,	Probability, Statistics, & Data Analysis:
and communicate	e mathematical ideas.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
b. Select, apply, and	Select, apply, and translate among mathematical representations to solve problems.	Basic Operations & Applications:
representations to		Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings) Probability Statistics & Data Analysis:
		Interpret and use information from figures, tables, and graphs
		Analyze and draw conclusions based on information from figures, tables, and graphs
		Expressions, Equations, & Inequalities:
		Write equations and inequalities that require planning, manipulating, and/or solving
		Graphical Representations:
		Solve problems integrating multiple algebraic and/or geometric concepts
		Properties of Plane Figures:
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
c. Use representation	Use representations to model and interpret physical, social, and mathematical phenomena.	Probability, Statistics, & Data Analysis:
social, and mathe		Translate from one representation of data to another (e.g., a bar graph to a circle graph)
		Manipulate data from tables and graphs
		Interpret and use information from figures, tables, and graphs
		Analyze and draw conclusions based on information from figures, tables, and graphs
		Expressions, Equations, & Inequalities:
		Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
		Write expressions, equations, and inequalities for common algebra settings
		Write expressions that require planning and/or manipulating to accurately model a situation
		Write equations and inequalities that require planning, manipulating, and/or solving
		Graphical Representations:
		Analyze and draw conclusions based on information from graphs in the coordinate plane

GEORGIA Core Math 3 Performance Standards	ACT Mathematics College Readiness Standards	
MATH READING CONTENT		
Students will enhance reading in all curriculum areas by:		
a. Reading in all curriculum areas		
• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas		
 Read both informational and fictional texts in a variety of genres and modes of discourse 		
Read technical texts related to various subject areas		
b. Discussing books		
 Discuss messages and themes from books in all subject areas. 		
 Respond to a variety of texts in multiple modes of discourse. 		
 Relate messages and themes from one subject area to messages and themes in another area. 		
• Evaluate the merit of texts in every subject discipline.		
 Examine author's purpose in writing. 		
 Recognize the features of disciplinary texts. 		
c. Building vocabulary knowledge		
 Demonstrate an understanding of contextual vocabulary in various subjects. 		
 Use content vocabulary in writing and speaking. 		
 Explore understanding of new words found in subject area texts. 		
d. Establishing context		
 Explore life experiences related to subject area content. 		
 Discuss in both writing and speaking how certain words are subject area related. 		
 Determine strategies for finding content and contextual meaning for unknown words 		

TABLE P

GE Sta	ORGIA Core Math 4 andards	ACT's WorkKeys Applied Mathematics Level Skills		
NU	JMBER AND OPERATIONS			
Stu	Students will use the complex number system.			
MC nur	MC4N1. Students will represent and operate with complex numbers.			
a.	Write square roots of negative numbers in imaginary form.			
b.	Write complex numbers in the form <i>a</i> + <i>bi</i> .			
C.	Add, subtract, multiply, and divide complex numbers.			
d.	Simplify expressions involving complex numbers.			
AL	GEBRA			
Students will investigate quadratic functions from numerical, analytical and graphical approaches, focusing on the use of these functions in problem-solving situations. Students will solve quadratic equations and inequalities and explore inverses of functions.				
MC form	4A1. Students will analyze quadratic functions in the ms $f(x) = ax^2 + bx + c$ and $f(x) = a(x - h)^2 + k$.			
a.	Convert between standard and vertex form.			
b.	Graph quadratic functions as transformations of the function $f(x) = x^2$.			
C.	Investigate and explain characteristics of quadratic functions, including domain, range, vertex, axis of symmetry, zeros, intercepts, extrema, intervals of increase and decrease, and rates of change.			
d.	Explore arithmetic series and various ways of computing their sums.			
e.	Explore sequences of partial sums of arithmetic series as examples of quadratic functions.			
MC4A2. Students will solve quadratic equations and inequalities in one variable.				
a.	Solve equations graphically using appropriate technology.			
b.	Find real and complex solutions of equations by factoring, taking square roots, and applying the quadratic formula.			
C.	Analyze the nature of roots using technology and using the discriminant.			
d.	Solve quadratic inequalities both graphically and algebraically, and describe the solutions using linear inequalities.			
MC4A3. Students will explore inverses of functions.				
a.	Discuss the characteristics of functions and their inverses, including one-to-oneness, domain, and range.			
b.	Determine inverses of linear, quadratic, and power			
	functions and functions of the form $f(x) = \frac{a}{x}$, including			
	the use of restricted domains.			
C.	Explore the graphs of functions and their inverses.			

TABLE P

GEORGIA Core Math 4 Standards	ACT's WorkKeys Applied Mathematics Level Skills	
d. Use composition to verify that functions are inverses of each other.		
GEOMETRY		
Students will understand and apply properties of circles and spheres and use them in determining related measures.		
MC4G1. Students will understand the properties of circles.		
 Understand and use properties of chords, tangents, and secants as an application of triangle similarity. 		
 Understand and use properties of central, inscribed, and related angles. 		
 Use the properties of circles to solve problems involving the length of an arc and the area of a sector. 	Decide what information, calculations, or unit conversions to use to solve the problem	
	Rearrange a formula before solving a problem	
	Use two formulas to change from one unit to another within the same system of measurement	
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations	
	Set up and manipulate complex ratios or proportions	
d. Justify measurements and relationships in circles using geometric and algebraic properties.		
MC4G2. Students will find and compare the measures of spheres.		
a. Use and apply surface area and volume of a sphere.	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations	
	Calculate multiple areas and volumes of spheres, cylinders, or cones	
 Determine the effect on surface area and volume of changing the radius or diameter of a sphere. 	Calculate multiple areas and volumes of spheres, cylinders, or cones	
	Set up and manipulate complex ratios or proportions	
DATA ANALYSIS AND PROBABILITY		
Students will demonstrate understanding of data analysis by posing questions to be answered by collecting data. Students will use regression to analyze data, and to make inferences.		
MC4D1. Students will determine an algebraic model to quantify the association between two quantitative variables.		
 Gather and plot data that can be modeled with quadratic functions. 		
b. Understand and apply the processes of quadratic regression for curve fitting using appropriate technology.		
PROCESS STANDARDS		
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.		

TABLE P

GEORGIA Core Math 4 Standards	ACT's WorkKeys Applied Mathematics Level Skills	
MC4P1. Students will solve problems (using appropriate technology).		
 Build new mathematical knowledge through problem solving. 	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages	
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals	
	Put the information in the right order before performing calculations	
	Decide what information, calculations, or unit conversions to use to solve the problem	
	Look up a formula and perform single-step conversions within or between systems of measurement	
	Find the best deal using one- and two-step calculations and then comparing results	
	Calculate perimeters and areas of basic shapes (rectangles and circles)	
	Calculate percentage discounts or markups	
	Use fractions, negative numbers, ratios, percentages, or mixed numbers	
	Rearrange a formula before solving a problem	
	Use two formulas to change from one unit to another within the same system of measurement	
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement	
	Find the best deal and use the result for another calculation	
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations	
	Find the volume of rectangular solids	
	Calculate multiple rates	
	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages	
	Calculate multiple areas and volumes of spheres, cylinders, or cones	
	Set up and manipulate complex ratios or proportions	
	Find the best deal when there are several choices	
 Solve problems that arise in mathematics and in other contexts. 	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages	
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals	
	Put the information in the right order before performing calculations	
	Decide what information, calculations, or unit conversions to use to solve the problem	
	Look up a formula and perform single-step conversions within or between systems of measurement	
	Find the best deal using one- and two-step calculations and then comparing results	
	Calculate perimeters and areas of basic shapes (rectangles and circles)	
TABLE P

GEORGIA Core Math 4 Standards	ACT's WorkKeys Applied Mathematics Level Skills
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem
	Use two formulas to change from one unit to another within the same system of measurement
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
	Find the volume of rectangular solids
	Calculate multiple rates
	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
	Calculate multiple areas and volumes of spheres, cylinders, or cones
	Set up and manipulate complex ratios or proportions
	Find the best deal when there are several choices
 Apply and adapt a variety of appropriate strategies to solve problems. 	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
	Put the information in the right order before performing calculations
	Decide what information, calculations, or unit conversions to use to solve the problem
	Look up a formula and perform single-step conversions within or between systems of measurement
	Find the best deal using one- and two-step calculations and then comparing results
	Calculate perimeters and areas of basic shapes (rectangles and circles)
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem
	Use two formulas to change from one unit to another within the same system of measurement
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
	Find the volume of rectangular solids
	Calculate multiple rates

TABLE P

GE Sta	ORGIA Core Math 4 andards	ACT's WorkKeys Applied Mathematics Level Skills
		Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
		Calculate multiple areas and volumes of spheres, cylinders, or cones
		Set up and manipulate complex ratios or proportions
		Find the best deal when there are several choices
d.	Monitor and reflect on the process of mathematical problem solving.	Find mistakes in items that belong at Levels 3, 4, and 5 Find mistakes in Level 6 items
MC arg	4P2. Students will reason and evaluate mathematical uments.	
a.	Recognize reasoning and proof as fundamental aspects of mathematics.	
b.	Make and investigate mathematical conjectures.	Rearrange a formula before solving a problem Solve problems that include nonlinear functions and/or that involve more than one unknown Set up and manipulate complex ratios or proportions
C.	Develop and evaluate mathematical arguments and proofs.	
d.	Select and use various types of reasoning and methods of proof.	
MC	4P3. Students will communicate mathematically.	
a.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
C.	Analyze and evaluate the mathematical thinking and	Find mistakes in items that belong at Levels 3, 4, and 5
	strategies of others.	Find mistakes in Level 6 items
		Find the best deal when there are several choices
d.	Use the language of mathematics to express mathematical ideas precisely.	
MC4P4. Students will make connections among mathematical ideas and to other disciplines.		
a.	Recognize and use connections among mathematical ideas.	
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	
C.	Recognize and apply mathematics in contexts outside of mathematics.	Decide what information, calculations, or unit conversions to use to solve the problem
MC wa	4P5. Students will represent mathematics in multiple ys.	
a.	Create and use representations to organize, record, and communicate mathematical ideas.	
b.	Select, apply, and translate among mathematical representations to solve problems.	Put the information in the right order before performing calculations
		Decide what information, calculations, or unit conversions to use to solve the problem
C.	Use representations to model and interpret physical, social, and mathematical phenomena.	

TABLE P

GE Sta	ORGIA Core Math 4 andards	ACT's WorkKeys Applied Mathematics Level Skills
M	ATH READING CONTENT	
Stu	idents will enhance reading in all curriculum areas by:	
a.	Reading in all curriculum areas	
	• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas	
	 Read both informational and fictional texts in a variety of genres and modes of discourse 	
	Read technical texts related to various subject areas	
b.	Discussing books	
	 Discuss messages and themes from books in all subject areas. 	
	 Respond to a variety of texts in multiple modes of discourse. 	
	 Relate messages and themes from one subject area to messages and themes in another area. 	
	• Evaluate the merit of texts in every subject discipline.	
	 Examine author's purpose in writing. 	
	 Recognize the features of disciplinary texts. 	
C.	Building vocabulary knowledge	
	 Demonstrate an understanding of contextual vocabulary in various subjects. 	
	 Use content vocabulary in writing and speaking. 	
	• Explore understanding of new words found in subject area texts.	
d.	Establishing context	
	 Explore life experiences related to subject area content. 	
	 Discuss in both writing and speaking how certain words are subject area related. 	
	 Determine strategies for finding content and contextual meaning for unknown words. 	

GE Pei	ORGIA Accelerated Math 1 rformance Standards	ACT Mathematics College Readiness Standards	
NU	IMBER AND OPERATIONS		
<mark>Stu</mark>	dents will use the complex number system.		
MA1N1. Students will represent and operate with complex numbers.			
а.	Write square roots of negative numbers in imaginary form.	Numbers: Concepts & Properties: Exhibit some knowledge of the complex numbers	
b.	Write complex numbers in the form $a + bi$.	Numbers: Concepts & Properties: Exhibit some knowledge of the complex numbers	
C.	Add, subtract, multiply, and divide complex numbers.	Numbers: Concepts & Properties:	
		Exhibit some knowledge of the complex numbers Multiply two complex numbers Apply properties of complex numbers	
d.	Simplify expressions involving complex numbers.	Numbers: Concepts & Properties: Exhibit some knowledge of the complex numbers Multiply two complex numbers Apply properties of complex numbers	
AL	GEBRA		
Stu with	Students will explore functions, solve equations and operate with radical, polynomial and rational expressions.		
MA cha alge	1A1. Students will explore and interpret the iracteristics of functions, using graphs, tables, and simple ebraic techniques.		
a.	Represent functions using function notation.		
b.	Graph the basic functions $f(x) = x^n$, where $n = 1$ to 3, $f(x) = \sqrt{x}$, $f(x) = x $, and $f(x) = \frac{1}{x}$.		
C.	Graph transformations of basic functions including vertical shifts, stretches, and shrinks, as well as reflections across the <i>x</i> - and <i>y</i> -axes.		
d.	Investigate and explain the characteristics of a function:	Graphical Representations:	
	domain, range, zeros, intercepts, intervals of increase and decrease, maximum and minimum values, and end behavior.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
e.	Relate to a given context the characteristics of a	Graphical Representations:	
	tunction, and use graphs and tables to investigate its behavior.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
f.	Recognize sequences as functions with domains that are sets of whole numbers.	Numbers: Concepts & Properties: Exhibit knowledge of logarithms and geometric sequences	
g.	Explore rates of change, comparing constant rates of change (i.e., slope) versus variable rates of change. Compare rates of change of linear, quadratic, square root, and other function families.	Graphical Representations: Exhibit knowledge of slope Determine the slope of a line from points or equations Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	

GEORGIA Accelerated Math 1 Performance Standards	ACT Mathematics College Readiness Standards	
h. Determine graphically and algebraically whe	ther a Graphical Representations:	
function has symmetry and whether it is even neither.	in, odd, or Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
	Analyze and draw conclusions based on information from graphs in the coordinate plane	
i. Understand that any equation in x can be in	terpreted as Expressions, Equations, & Inequalities:	
the equation $f(x) = g(x)$, and interpret the so	Find solutions to systems of linear equations	
point(s) of the graphs of $y = f(x)$ and $y = g(x)$	Graphical Representations:	
	Analyze and draw conclusions based on information from graphs in the coordinate plane	
MA1A2. Students will simplify and operate with radical expressions, polynomials, and rational expressions.		
a. Simplify algebraic and numeric expressions	involving Numbers: Concepts & Properties:	
square root.	Work with squares and square roots of numbers	
	Expressions, Equations, & Inequalities:	
	Manipulate expressions and equations	
b. Perform operations with square roots.	Expressions, Equations, & Inequalities:	
	Manipulate expressions and equations	
c. Add, subtract, multiply, and divide polynomi	als. Expressions, Equations, & Inequalities:	
	Combine like terms (e.g., $2x + 5x$)	
	Add and subtract simple algebraic expressions	
	Multiply two binomials	
	Add, subtract, and multiply polynomials	
d. Add, subtract, multiply, and divide rational e	xpressions. Expressions, Equations, & Inequalities:	
	Manipulate expressions and equations	
e. Factor expressions by greatest common fac	tor, Expressions, Equations, & Inequalities:	
the formulas below. $(x + y)^2 = x^2 + 2xy + y^2$	Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)	
(x - y) = x - 2xy + y (x + y)(x - y) = x ² - y ² (x + a)(x + b) = x ² + (a + b)x + ab		
$(x + y)^{3} = x^{3} + 3x^{2}y + 3xy^{2} + y^{3}$ (x - y) ³ = x ³ - 3x ² y + 3xy ² - y ³		
f. Use area and volume models for polynomia	l arithmetic. Expressions, Equations, & Inequalities:	
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)	
MA1A3. Students will analyze quadratic function forms $f(x) = ax^2 + bx + c$ and $f(x) = a(x - h)^2 + k$.	ns in the	
a. Convert between standard and vertex form.	Expressions, Equations, & Inequalities:	
	Manipulate expressions and equations	

GE Pe	ORGIA Accelerated Math 1 rformance Standards	ACT Mathematics College Readiness Standards
b.	Graph quadratic functions as transformations of the	Graphical Representations:
	function $f(x) = x^2$.	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)
		Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
C.	Investigate and explain characteristics of quadratic	Graphical Representations:
	functions, including domain, range, vertex, axis of symmetry, zeros, intercepts, extrema, intervals of increase and decrease, and rates of change.	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)
		Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
d.	Explore arithmetic series and various ways of	Numbers: Concepts & Properties:
	computing their sums.	Exhibit knowledge of logarithms and geometric sequences
e.	Explore sequences of partial sums of arithmetic series	Numbers: Concepts & Properties:
	as examples of quadratic functions.	Exhibit knowledge of logarithms and geometric sequences
MA ine	1A4. Students will solve quadratic equations and qualities in one variable.	
a.	Solve equations graphically using appropriate	Expressions, Equations, & Inequalities:
	technology.	Solve quadratic equations
b.	Find real and complex solutions of equations by	Expressions, Equations, & Inequalities:
	factoring, taking square roots, and applying the quadratic formula.	Solve quadratic equations
C.	Analyze the nature of roots using technology and using the discriminant.	
d.	Solve quadratic inequalities both graphically and	Graphical Representations:
	algebraically, and describe the solutions using linear inequalities.	Match number line graphs with solution sets of simple quadratic inequalities
MA1A5. Students will investigate step and piecewise functions, including greatest integer and absolute value functions.		
a.	Write absolute value functions as piecewise functions.	Expressions, Equations, & Inequalities:
		Manipulate expressions and equations
b.	Investigate and explain characteristics of a variety of	Graphical Representations:
	piecewise functions including domain, range, vertex,	Identify characteristics of graphs based on a set of
	discontinuity, intervals over which the function is	conditions or on a general equation such as $y = ax^2 + c$
	constant, intervals of increase and decrease, and rates	
C	Solve absolute value equations and inequalities	Expressions, Equations, & Inequalities:
0.	analytically, graphically, and by using appropriate	Solve absolute value equations
	technology.	Solve simple absolute value inequalities
GEOMETRY		
Students will explore, understand and use the formal		
language of reasoning and justification. Students will apply		

properties of polygons, circles and spheres, and determine distances and points of concurrence.

GE Pe	ORGIA Accelerated Math 1 rformance Standards	ACT Mathematics College Readiness Standards
MA <mark>figu</mark>	1G1. Students will investigate properties of geometric ares in the coordinate plane.	
a.	Determine the distance between two points.	Graphical Representations:
		Use the distance formula
b.	Determine the distance between a point and a line.	Graphical Representations:
		Use the distance formula
C.	Determine the midpoint of a segment.	Graphical Representations:
		Find the midpoint of a line segment
d.	Understand the distance formula as an application of	Properties of Plane Figures:
	the Pythagorean theorem.	Use the Pythagorean theorem
e.	Use the coordinate plane to investigate properties of	Graphical Representations:
	and verify conjectures related to triangles and quadrilaterals.	Analyze and draw conclusions based on information from
MA ma	1G2. Students will understand and use the language of the	
a.	Use conjecture, inductive reasoning, deductive	Properties of Plane Figures:
	reasoning, counterexamples, and indirect proof as appropriate.	Draw conclusions based on a set of conditions
b.	Understand and use the relationships among a statement and its converse, inverse, and contrapositive.	
MA of t	1G3. Students will discover, prove, and apply properties riangles, quadrilaterals, and other polygons.	
a.	Determine the sum of interior and exterior angles in a	Properties of Plane Figures:
polygon.	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)	
		Use several angle properties to find an unknown angle measure
		Use properties of isosceles triangles
b.	Understand and use the triangle inequality, the side- angle inequality, and the exterior-angle inequality.	
C.	Understand and use congruence postulates and	Properties of Plane Figures:
	theorems for triangles (SSS, SAS, ASA, AAS, HL).	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
d.	Understand, use, and prove properties of and	Properties of Plane Figures:
	relationships among special quadrilaterals: parallelogram, rectangle, rhombus, square, trapezoid, and kite.	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
		Use several angle properties to find an unknown angle measure
e.	Find and use points of concurrency in triangles: incenter, orthocenter, circumcenter, and centroid.	
MA	1G4. Students will understand the properties of circles.	
a.	Understand and use properties of chords, tangents, and	Properties of Plane Figures:
	secants as an application of triangle similarity.	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
		Use relationships among angles, arcs, and distances in a circle

GE Pe	ORGIA Accelerated Math 1 rformance Standards	ACT Mathematics College Readiness Standards
b.	Understand and use properties of central, inscribed,	Properties of Plane Figures:
	and related angles.	Use relationships among angles, arcs, and distances in a circle
C.	Use the properties of circles to solve problems involving	Properties of Plane Figures:
	the length of an arc and the area of a sector.	Use relationships among angles, arcs, and distances in a circle
		Measurement:
		Compute the area and circumference of circles after identifying necessary information
d.	Justify measurements and relationships in circles using	Properties of Plane Figures:
	geometric and algebraic properties.	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
MA <mark>sph</mark>	1G5. Students will find and compare the measures of neres.	
a.	Use and apply surface area and volume of a sphere.	Measurement:
		Use geometric formulas when all necessary information is given
b.	Determine the effect on surface area and volume of	Properties of Plane Figures:
	changing the radius or diameter of a sphere.	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
DA	TA ANALYSIS AND PROBABILITY	
Stu pro ana dat inte det	dents will use counting techniques and determine bability. Students will demonstrate understanding of data alysis by posing questions to be answered by collecting a. Students will organize, represent, investigate, erpret, and make inferences from data. Students will ermine algebraic models from data.	
MA <mark>rela</mark>	1D1. Students will determine the number of outcomes ated to a given event.	
a.	Apply the addition and multiplication principles of	Probability, Statistics, & Data Analysis:
	counting.	Exhibit knowledge of simple counting techniques
		Use Venn diagrams in counting
		Apply counting techniques
b.	Calculate and use simple permutations and	Probability, Statistics, & Data Analysis:
	combinations.	Apply counting techniques
MA	1D2. Students will use the basic laws of probability.	
a.	Find the probabilities of mutually exclusive events.	Probability, Statistics, & Data Analysis:
		Determine the probability of a simple event
<u> </u>		Compute straigntforward probabilities for common situations
D.	Find the probabilities of dependent events.	Probability, Statistics, & Data Analysis:
C	Calculate conditional probabilities	Probability, Statistics, & Data Analysis
0.	ourodiate conditional probabilities.	Exhibit knowledge of conditional and joint probability

GEORGIA Accelerated Math 1 Performance Standards	ACT Mathematics College Readiness Standards
d. Use expected value to predict outcomes.	Probability, Statistics, & Data Analysis:
	Analyze and draw conclusions based on information from figures, tables, and graphs
MA1D3. Students will relate samples to a population.	
a. Compare summary statistics (mean, median, quartiles,	Probability, Statistics, & Data Analysis:
and interquartile range) from one sample data distribution to another sample data distribution in describing center and variability of the data distributions.	Interpret and use information from figures, tables, and graphs
b. Compare the averages of the summary statistics from a	Probability, Statistics, & Data Analysis:
large number of samples to the corresponding population parameters.	Analyze and draw conclusions based on information from figures, tables, and graphs
c. Understand that a random sample is used to improve the chance of selecting a representative sample.	
MA1D4. Students will explore variability of data by determining the mean absolute deviation (the average of th absolute values of the deviations).	e
MA1D5. Students will determine an algebraic model to quantify the association between two quantitative variables.	
a. Gather and plot data that can be modeled with linear	Probability, Statistics, & Data Analysis:
and quadratic functions.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Graphical Representations:
	Locate points in the coordinate plane
b. Examine the issues of curve fitting by finding good	Probability, Statistics, & Data Analysis:
median-median line and "eyeballing."	Perform computations on data from tables and graphs
	graphs
	Expressions, Equations, & Inequalities:
	Write expressions that require planning and/or manipulating
	to accurately model a situation
	Graphical Representations:
	plane
c. Understand and apply the processes of linear and quadratic regression for curve fitting using appropriate technology.	
PROCESS STANDARDS	
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.	
MA1P1. Students will solve problems (using appropriate technology).	
a. Build new mathematical knowledge through problem solving.	

GEORGIA Accelerated Math 1 Performance Standards	ACT Mathematics College Readiness Standards
b. Solve problems that arise in mathematics and in other	Basic Operations & Applications:
contexts.	Perform one-operation computation with whole numbers and decimals
	Solve problems in one or two steps using whole numbers
	Perform common conversions (e.g., inches to feet or hours to minutes)
	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent
	Solve some routine two-step arithmetic problems
	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average
	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)
	Solve word problems containing several rates, proportions, or percentages
	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)
	Probability, Statistics, & Data Analysis:
	Calculate the average of a list of positive whole numbers
	Perform a single computation using information from a table or chart
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Read tables and graphs
	Perform computations on data from tables and graphs
	Use the relationship between the probability of an event and the probability of its complement
	Calculate the missing data value, given the average and all data values but one
	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Determine the probability of a simple event
	Exhibit knowledge of simple counting techniques
	Calculate the average, given the frequency counts of all the data values
	Manipulate data from tables and graphs
	Compute straightforward probabilities for common situations
	Use Venn diagrams in counting
	Calculate or use a weighted average
	Interpret and use information from figures, tables, and graphs

GEORGIA Accelerated Math 1 Performance Standards	ACT Mathematics College Readiness Standards
	Apply counting techniques
	Compute a probability when the event and/or sample space are not given or obvious
	Distinguish between mean, median, and mode for a list of numbers
	Analyze and draw conclusions based on information from figures, tables, and graphs
	Exhibit knowledge of conditional and joint probability
	Numbers: Concepts & Properties:
	Recognize equivalent fractions and fractions in lowest terms
	Recognize one-digit factors of a number
	Identify a digit's place value
	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	Find and use the least common multiple
	Order fractions
	Work with numerical factors
	Work with scientific notation
	Work with squares and square roots of numbers
	Work problems involving positive integer exponents
	Work with cubes and cube roots of numbers
	Determine when an expression is undefined
	Exhibit some knowledge of the complex numbers
	Apply number properties involving prime factorization
	Apply number properties involving even/odd numbers and factors/multiples
	Apply number properties involving positive/negative numbers
	Apply rules of exponents
	Multiply two complex numbers
	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
	Exhibit knowledge of logarithms and geometric sequences
	Apply properties of complex numbers
	Expressions, Equations, & Inequalities:
	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)
	Solve equations in the form $x + a = b$, where <i>a</i> and <i>b</i> are whole numbers or decimals
	Substitute whole numbers for unknown quantities to evaluate expressions
	Solve one-step equations having integer or decimal answers
	Combine like terms (e.g., $2x + 5x$)

GEORGIA Accelerated Math 1 Performance Standards	ACT Mathematics College Readiness Standards
	Evaluate algebraic expressions by substituting integers for unknown quantities
	Add and subtract simple algebraic expressions
	Solve routine first-degree equations
	Perform straightforward word-to-symbol translations
	Multiply two binomials
	Solve real-world problems using first-degree equations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Identify solutions to simple quadratic equations
	Add, subtract, and multiply polynomials
	Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)
	Solve first-degree inequalities that do not require reversing the inequality sign
	Manipulate expressions and equations
	Write expressions, equations, and inequalities for common algebra settings
	Solve linear inequalities that require reversing the inequality sign
	Solve absolute value equations
	Solve quadratic equations
	Find solutions to systems of linear equations
	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Solve simple absolute value inequalities
	Graphical Representations:
	Identify the location of a point with a positive coordinate on the number line
	Locate points on the number line and in the first quadrant
	Locate points in the coordinate plane
	Comprehend the concept of length on the number line
	Exhibit knowledge of slope
	Identify the graph of a linear inequality on the number line
	Determine the slope of a line from points or equations
	Match linear graphs with their equations
	Find the midpoint of a line segment
	Interpret and use information from graphs in the coordinate plane
	Match number line graphs with solution sets of linear inequalities
	Use the distance formula

GEORGIA Accelerated Math 1 Performance Standards	ACT Mathematics College Readiness Standards
	Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point
	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)
	Match number line graphs with solution sets of simple quadratic inequalities
	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
	Solve problems integrating multiple algebraic and/or geometric concepts
	Analyze and draw conclusions based on information from graphs in the coordinate plane
	Properties of Plane Figures:
	Exhibit some knowledge of the angles associated with parallel lines
	Find the measure of an angle using properties of parallel lines
	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
	Use several angle properties to find an unknown angle measure
	Recognize Pythagorean triples
	Use properties of isosceles triangles
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
	Use the Pythagorean theorem
	Draw conclusions based on a set of conditions
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
	Use relationships among angles, arcs, and distances in a circle
	Measurement:
	Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
	Compute the perimeter of polygons when all side lengths are given
	Compute the area of rectangles when whole number dimensions are given
	Compute the area and perimeter of triangles and rectangles in simple problems
	Use geometric formulas when all necessary information is given
	Compute the area of triangles and rectangles when one or more additional simple steps are required
	Compute the area and circumference of circles after identifying necessary information
	1

GEORGIA Accelerated Math 1 Performance Standards	ACT Mathematics College Readiness Standards
	Compute the perimeter of simple composite geometric figures with unknown side lengths
	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure
	Use scale factors to determine the magnitude of a size change
	Compute the area of composite geometric figures when planning or visualization is required
	Functions:
	Evaluate quadratic functions, expressed in function notation, at integer values
	Evaluate polynomial functions, expressed in function notation, at integer values
	Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
	Evaluate composite functions at integer values
	Apply basic trigonometric ratios to solve right-triangle problems
	Write an expression for the composite of two simple functions
	Use trigonometric concepts and basic identities to solve problems
	Exhibit knowledge of unit circle trigonometry
	Match graphs of basic trigonometric functions with their equations
c. Apply and adapt a variety of appropriate strategies to	Expressions, Equations, & Inequalities:
solve problems.	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Graphical Representations:
	Solve problems integrating multiple algebraic and/or geometric concepts
	Properties of Plane Figures:
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
 Monitor and reflect on the process of mathematical problem solving. 	
MA1P2. Students will reason and evaluate mathematical arguments.	
a. Recognize reasoning and proof as fundamental aspects of mathematics.	

GE Pe	ORGIA Accelerated Math 1 rformance Standards	ACT Mathematics College Readiness Standards
b.	Make and investigate mathematical conjectures.	Probability, Statistics, & Data Analysis:
		Analyze and draw conclusions based on information from figures, tables, and graphs
		Numbers: Concepts & Properties:
		Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
		Graphical Representations:
		Analyze and draw conclusions based on information from graphs in the coordinate plane
		Properties of Plane Figures:
		Draw conclusions based on a set of conditions
C.	Develop and evaluate mathematical arguments and	Probability, Statistics, & Data Analysis:
	proofs.	Analyze and draw conclusions based on information from figures, tables, and graphs
		Numbers: Concepts & Properties:
		Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
		Graphical Representations:
		Analyze and draw conclusions based on information from graphs in the coordinate plane
		Properties of Plane Figures:
	-	Draw conclusions based on a set of conditions
d.	Select and use various types of reasoning and methods	Numbers: Concepts & Properties:
		properties, and/or relationships between expressions and numbers
		Properties of Plane Figures:
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
MA	1P3. Students will communicate mathematically.	
a.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
C.	Analyze and evaluate the mathematical thinking and strategies of others.	
d.	Use the language of mathematics to express	Expressions, Equations, & Inequalities:
	mathematical ideas precisely.	Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
		Write expressions that require planning and/or manipulating to accurately model a situation
		Write equations and inequalities that require planning, manipulating, and/or solving

GE Pe	ORGIA Accelerated Math 1 rformance Standards	ACT Mathematics College Readiness Standards	
MA ma	MA1P4. Students will make connections among mathematical ideas and to other disciplines.		
а.	Recognize and use connections among mathematical	Properties of Plane Figures:	
	ideas.	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas	
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.		
C.	Recognize and apply mathematics in contexts outside of mathematics.		
MA waj	1P5. Students will represent mathematics in multiple ys.		
a.	Create and use representations to organize, record, and	Probability, Statistics, & Data Analysis:	
	communicate mathematical ideas.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)	
b.	Select, apply, and translate among mathematical	Basic Operations & Applications:	
	representations to solve problems.	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings) Probability, Statistics, & Data Analysis:	
		Interpret and use information from figures, tables, and graphs	
		Analyze and draw conclusions based on information from figures, tables, and graphs	
		Expressions, Equations, & Inequalities:	
		Write equations and inequalities that require planning, manipulating, and/or solving	
		Graphical Representations:	
		Solve problems integrating multiple algebraic and/or geometric concepts	
		Properties of Plane Figures:	
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas	



GEORGIA Accelerated Math 1 Performance Standards	ACT Mathematics College Readiness Standards
c. Use representations to model and interpret physical,	Probability, Statistics, & Data Analysis:
social, and mathematical phenomena.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Manipulate data from tables and graphs
	Interpret and use information from figures, tables, and graphs
	Analyze and draw conclusions based on information from figures, tables, and graphs
	Expressions, Equations, & Inequalities:
	Perform straightforward word-to-symbol translations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Write expressions, equations, and inequalities for common algebra settings
	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Graphical Representations:
	Analyze and draw conclusions based on information from graphs in the coordinate plane
MATH READING CONTENT	

MATH READING CONTENT

Stu	Students will enhance reading in all curriculum areas by:		
a.	Reading in all curriculum areas		
	• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas		
	• Read both informational and fictional texts in a variety of genres and modes of discourse		
	Read technical texts related to various subject areas		
b.	Discussing books		
	 Discuss messages and themes from books in all subject areas. 		
	 Respond to a variety of texts in multiple modes of discourse. 		
	 Relate messages and themes from one subject area to messages and themes in another area. 		
	• Evaluate the merit of texts in every subject discipline.		
	 Examine author's purpose in writing. 		
	Recognize the features of disciplinary texts.		

GEORGIA Accelerated Math 1 Performance Standards		ACT Mathematics College Readiness Standards
C.	Building vocabulary knowledge	
	 Demonstrate an understanding of contextual vocabulary in various subjects. 	
	 Use content vocabulary in writing and speaking. 	
	 Explore understanding of new words found in subject area texts. 	
d.	Establishing context	
	 Explore life experiences related to subject area content. 	
	 Discuss in both writing and speaking how certain words are subject area related. 	
	 Determine strategies for finding content and contextual meaning for unknown words. 	



GEORGIA Acceleration Standards	ted Math 1	ACT's WorkKeys Applied Mathematics Level Skills
NUMBER AND OPERATIONS		
Students will use the co	omplex number system.	
MA1N1. Students will r numbers.	epresent and operate with complex	
a. Write square roots form.	of negative numbers in imaginary	
b. Write complex num	bers in the form a + bi.	
c. Add, subtract, mult	iply, and divide complex numbers.	
d. Simplify expression	ns involving complex numbers.	
ALGEBRA		
Students will explore fur operate with radical, po	nctions, solve equations and lynomial and rational expressions.	
MA1A1. Students will e characteristics of functi simple algebraic techni	explore and interpret the ons, using graphs, tables, and ques.	
a. Represent function	s using function notation.	
b. Graph the basic fur	nctions $f(x) = xn$, where $n = 1$ to 3,	
$f(\mathbf{x}) = \sqrt{x}, f(\mathbf{x}) = \mathbf{x} $	$f(x) = \frac{1}{x}$.	
c. Graph transformati vertical shifts, streto reflections across t	ons of basic functions including ches, and shrinks, as well as he <i>x</i> - and <i>y</i> -axes.	
 Investigate and exp domain, range, zer and decrease, max behavior. 	blain the characteristics of a function: os, intercepts, intervals of increase kimum and minimum values, and end	
e. Relate to a given confunction, and use g behavior.	ontext the characteristics of a raphs and tables to investigate its	
f. Recognize sequence are sets of whole n	ces as functions with domains that umbers.	
g. Explore rates of ch change (i.e., slope) Compare rates of c root, and other func	ange, comparing constant rates of) versus variable rates of change. change of linear, quadratic, square ction families.	
 Determine graphica function has symm neither. 	ally and algebraically whether a etry and whether it is even, odd, or	
 Understand that an the equation f(x) = the equation as the point(s) of the grap 	by equation in <i>x</i> can be interpreted as $g(x)$, and interpret the solutions of a <i>x</i> -value(s) of the intersection the of $y = f(x)$ and $y = g(x)$.	
MA1A2. Students will simplify and operate with radical expressions, polynomials, and rational expressions.		
a. Simplify algebraic a square root.	and numeric expressions involving	
b. Perform operations	s with square roots.	
c. Add, subtract, mult	iply, and divide polynomials.	

GEORGIA Accelerated Math 1 Standards		ACT's WorkKeys Applied Mathematics Level Skills
d.	Add, subtract, multiply, and divide rational expressions.	Solve problems that require one or two operations Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals Use fractions, negative numbers, ratios, percentages, or mixed numbers
		Set up and manipulate complex ratios or proportions
e.	Factor expressions by greatest common factor, grouping, trial and error, and special products limited to the formulas below. $(x + y)^2 = x^2 + 2xy + y^2$ $(x - y)^2 = x^2 - 2xy + y^2$ $(x + y)(x - y) = x^2 - y^2$ $(x + a)(x + b) = x^2 + (a + b)x + ab$ $(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$ $(x - y)^3 = x^3 - 3x^2y + 3xy^2 - y^3$	
f.	Use area and volume models for polynomial arithmetic.	
MA for	1A3. Students will analyze quadratic functions in the ms $f(x) = ax^2 + bx + c$ and $f(x) = a(x - h)^2 + k$.	
a.	Convert between standard and vertex form.	
b.	Graph quadratic functions as transformations of the function $f(x) = x^2$.	
C.	Investigate and explain characteristics of quadratic functions, including domain, range, vertex, axis of symmetry, zeros, intercepts, extrema, intervals of increase and decrease, and rates of change.	
d.	Explore arithmetic series and various ways of computing their sums.	
e.	Explore sequences of partial sums of arithmetic series as examples of quadratic functions.	
MA1A4. Students will solve quadratic equations and inequalities in one variable.		
a.	Solve equations graphically using appropriate technology.	
b.	Find real and complex solutions of equations by factoring, taking square roots, and applying the quadratic formula.	
C.	Analyze the nature of roots using technology and using the discriminant.	
d.	Solve quadratic inequalities both graphically and algebraically, and describe the solutions using linear inequalities.	
MA fun fun	1A5. Students will investigate step and piecewise ctions, including greatest integer and absolute value ctions.	
a.	Write absolute value functions as piecewise functions.	
b.	Investigate and explain characteristics of a variety of piecewise functions including domain, range, vertex, axis of symmetry, zeros, intercepts, extrema, points of discontinuity, intervals over which the function is constant, intervals of increase and decrease, and rates of change.	

GE Sta	ORGIA Accelerated Math 1 andards	ACT's WorkKeys Applied Mathematics Level Skills
C.	Solve absolute value equations and inequalities analytically, graphically, and by using appropriate technology.	
GE	OMETRY	
Stu lan pro dis	dents will explore, understand and use the formal guage of reasoning and justification. Students will apply perties of polygons, circles and spheres, and determine tances and points of concurrence.	
MA figu	1G1. Students will investigate properties of geometric ures in the coordinate plane.	
a.	Determine the distance between two points.	
b.	Determine the distance between a point and a line.	
C.	Determine the midpoint of a segment.	
d.	Understand the distance formula as an application of the Pythagorean theorem.	
e.	Use the coordinate plane to investigate properties of and verify conjectures related to triangles and quadrilaterals.	
MA ma	1G2. Students will understand and use the language of thematical argument and justification.	
a.	Use conjecture, inductive reasoning, deductive reasoning, counterexamples, and indirect proof as appropriate.	
b.	Understand and use the relationships among a statement and its converse, inverse, and contrapositive.	
MA of t	1G3. Students will discover, prove, and apply properties riangles, quadrilaterals, and other polygons.	
a.	Determine the sum of interior and exterior angles in a polygon.	
b.	Understand and use the triangle inequality, the side- angle inequality, and the exterior-angle inequality.	
C.	Understand and use congruence postulates and theorems for triangles (SSS, SAS, ASA, AAS, HL).	
d.	Understand, use, and prove properties of and relationships among special quadrilaterals: parallelogram, rectangle, rhombus, square, trapezoid, and kite.	
e.	Find and use points of concurrency in triangles: incenter, orthocenter, circumcenter, and centroid.	
MA1G4. Students will understand the properties of circles.		
a.	Understand and use properties of chords, tangents, and secants as an application of triangle similarity.	
b.	Understand and use properties of central, inscribed, and related angles.	

GE Sta	ORGIA Accelerated Math 1 andards	ACT's WorkKeys Applied Mathematics Level Skills
C.	Use the properties of circles to solve problems involving the length of an arc and the area of a sector.	Decide what information, calculations, or unit conversions to use to solve the problem
		Rearrange a formula before solving a problem
		Use two formulas to change from one unit to another within the same system of measurement
		Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
		Set up and manipulate complex ratios or proportions
d.	Justify measurements and relationships in circles using geometric and algebraic properties.	
MA spł	1G5. Students will find and compare the measures of neres.	
a.	Use and apply surface area and volume of a sphere.	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
		Calculate multiple areas and volumes of spheres, cylinders, or cones
b.	Determine the effect on surface area and volume of changing the radius or diameter of a sphere.	Calculate multiple areas and volumes of spheres, cylinders, or cones
		Set up and manipulate complex ratios or proportions
DA	ATA ANALYSIS AND PROBABILITY	
Students will use counting techniques and determine probability. Students will demonstrate understanding of data analysis by posing questions to be answered by collecting data. Students will organize, represent, investigate, interpret, and make inferences from data. Students will determine algebraic models from data.		
MA1D1. Students will determine the number of outcomes related to a given event.		
a.	Apply the addition and multiplication principles of counting.	
b.	Calculate and use simple permutations and combinations.	
MA	1D2. Students will use the basic laws of probability.	
a.	Find the probabilities of mutually exclusive events.	
b.	Find the probabilities of dependent events.	
C.	Calculate conditional probabilities.	
d.	Use expected value to predict outcomes.	
MA1D3. Students will relate samples to a population.		
a.	Compare summary statistics (mean, median, quartiles, and interquartile range) from one sample data distribution to another sample data distribution in describing center and variability of the data distributions.	
b.	Compare the averages of the summary statistics from a large number of samples to the corresponding population parameters.	

GEORGIA Accelerated Math 1 Standards		ACT's WorkKeys Applied Mathematics Level Skills
C.	Understand that a random sample is used to improve the chance of selecting a representative sample.	
MA det the	1D4. Students will explore variability of data by ermining the mean absolute deviation (the average of absolute values of the deviations).	
MA qua	1D5. Students will determine an algebraic model to antify the association between two quantitative variables.	
a.	Gather and plot data that can be modeled with linear and quadratic functions.	
b.	Examine the issues of curve fitting by finding good linear fits to data using simple methods such as the median-median line and "eyeballing."	
C.	Understand and apply the processes of linear and quadratic regression for curve fitting using appropriate technology.	
PR	OCESS STANDARDS	
The eac em pro	e following process standards are essential to mastering th of the mathematics content standards. They phasize critical dimensions of the mathematical ficiency that all students need.	
MN tec	I3P1. Students will solve problems (using appropriate hnology).	
a.	Build new mathematical knowledge through problem solving.	
b.	Solve problems that arise in mathematics and in other contexts.	
C.	Apply and adapt a variety of appropriate strategies to solve problems.	
d.	Monitor and reflect on the process of mathematical problem solving.	Find mistakes in items that belong at Levels 3, 4, and 5 Find mistakes in Level 6 items
MA1P2. Students will reason and evaluate mathematical arguments.		
a.	Recognize reasoning and proof as fundamental aspects of mathematics.	
b <mark>.</mark>	Make and investigate mathematical conjectures.	Rearrange a formula before solving a problem
		Solve problems that include nonlinear functions and/or that involve more than one unknown
		Set up and manipulate complex ratios or proportions
C.	Develop and evaluate mathematical arguments and proofs.	
d.	Select and use various types of reasoning and methods of proof.	
MA1P3. Students will communicate mathematically.		
a.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	

GEORGIA Accelerated Math 1 Standards		ACT's WorkKeys Applied Mathematics Level Skills
C.	Analyze and evaluate the mathematical thinking and	Find mistakes in items that belong at Levels 3, 4, and 5
	strategies of others.	Find mistakes in Level 6 items
		Find the best deal when there are several choices
d.	Use the language of mathematics to express mathematical ideas precisely.	
MA ma	1P4. Students will make connections among thematical ideas and to other disciplines.	
а.	Recognize and use connections among mathematical ideas.	
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	
C.	Recognize and apply mathematics in contexts outside of mathematics.	Decide what information, calculations, or unit conversions to use to solve the problem
MA way	1P5. Students will represent mathematics in multiple ys.	
а.	Create and use representations to organize, record, and communicate mathematical ideas.	
b.	Select, apply, and translate among mathematical representations to solve problems.	Put the information in the right order before performing calculations
		Decide what information, calculations, or unit conversions to use to solve the problem
C.	Use representations to model and interpret physical, social, and mathematical phenomena.	
M	MATH READING CONTENT	
Stu	Students will enhance reading in all curriculum areas by:	
a.	Reading in all curriculum area	
	• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas	
	• Read both informational and fictional texts in a variety of genres and modes of discourse	
	Read technical texts related to various subject areas	
b.	Discussing books	
	 Discuss messages and themes from books in all subject areas. 	
	 Respond to a variety of texts in multiple modes of discourse. 	
	 Relate messages and themes from one subject area to messages and themes in another area. 	
	• Evaluate the merit of texts in every subject discipline.	
	 Examine author's purpose in writing. 	
	Recognize the features of disciplinary texts.	

GEORGIA Accelerated Math 1 Standards		ACT's WorkKeys Applied Mathematics Level Skills
C.	Building vocabulary knowledge	
	 Demonstrate an understanding of contextual vocabulary in various subjects. 	
	 Use content vocabulary in writing and speaking. 	
	• Explore understanding of new words found in subject area texts.	
d.	Establishing context	
	 Explore life experiences related to subject area content. 	
	 Discuss in both writing and speaking how certain words are subject area related. 	
	 Determine strategies for finding content and contextual meaning for unknown words. 	

GEORGIA Accelerated Math 2 Performance Standards

ACT Mathematics College Readiness Standards

ALGEBRA		
Students will investigate exponential, logarithmic, and polynomial functions of higher degree; understand matrices and use them to solve problems; and solve linear programming problems in two variables.		
MA	2A1. Students will explore exponential functions.	
a.	Extend properties of exponents to include all integer	Numbers: Concepts & Properties:
	exponents.	Apply rules of exponents
b.	Investigate and explain characteristics of exponential	Graphical Representations:
	functions, including domain and range, asymptotes, zeros, intercepts, intervals of increase and decrease, rates of change, and end behavior.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
C.	Graph functions as transformations of $f(x) = a^{x}$.	Graphical Representations:
		Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
d.	Solve simple exponential equations and inequalities	Graphical Representations:
	analytically, graphically, and by using appropriate technology.	Solve problems integrating multiple algebraic and/or geometric concepts
e.	Understand and use basic exponential functions as	Expressions, Equations, & Inequalities:
	models of real phenomena.	Write expressions that require planning and/or manipulating to accurately model a situation
f.	Understand and recognize geometric sequences as	Numbers: Concepts & Properties:
	exponential functions with domains that are sets of whole numbers.	Exhibit knowledge of logarithms and geometric sequences
g.	Interpret the constant ratio in a geometric sequence as	Numbers: Concepts & Properties:
the base of the associated exponential function.	Exhibit knowledge of logarithms and geometric sequences	
MA2A2. Students will explore inverses of functions.		
a.	Discuss the characteristics of functions and their	Graphical Representations:
	inverses, including one-to-oneness, domain, and range.	Analyze and draw conclusions based on information from graphs in the coordinate plane
b.	Determine inverses of linear, quadratic, and power	Expressions, Equations, & Inequalities:
	functions and functions of the form $f(x) = \frac{a}{x}$, including	Manipulate expressions and equations
	the use of restricted domains.	
C.	Explore the graphs of functions and their inverses.	Graphical Representations:
		Analyze and draw conclusions based on information from graphs in the coordinate plane
d.	Use composition to verify that functions are inverses of	Functions:
	each other.	Write an expression for the composite of two simple functions
MA2A3. Students will analyze graphs of polynomial functions of higher degree.		
a.	Graph simple polynomial functions as translations of	Graphical Representations:
	the function $f(x) = ax^2$.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
b.	Understand the effects of the following on the graph of	Graphical Representations:
	a polynomial function: degree, lead coefficient, and multiplicity of real zeros.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$

GEORGIA Accelerated Math 2 Performance Standards		ACT Mathematics College Readiness Standards
C.	Determine whether a polynomial function has symmetry and whether it is even, odd, or neither.	Graphical Representations:
		Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
d.	Investigate and explain characteristics of polynomial	Graphical Representations:
	functions, including domain and range, intercepts, zeros, relative and absolute extrema, intervals of increase and decrease, and end behavior.	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
M/ inv	MA2A4. Students will explore logarithmic functions as inverses of exponential functions.	
a.	Define and understand the properties of n th roots.	Numbers: Concepts & Properties:
		Work with squares and square roots of numbers
		Work with cubes and cube roots of numbers
		Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
b.	Extend properties of exponents to include rational	Numbers: Concepts & Properties:
	exponents.	Apply rules of exponents
C.	Define logarithmic functions as inverses of exponential	Numbers: Concepts & Properties:
	functions.	Exhibit knowledge of logarithms and geometric sequences
d.	Understand and use properties of logarithms by	Numbers: Concepts & Properties:
	extending laws of exponents.	Exhibit knowledge of logarithms and geometric sequences
e.	Investigate and explain characteristics of exponential and logarithmic functions including domain and range, asymptotes, zeros, intercepts, intervals of increase and decrease, and rate of change.	Numbers: Concepts & Properties:
		Exhibit knowledge of logarithms and geometric sequences
		Graphical Representations:
		Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
f.	Graph functions as transformations of $f(x) = a^x$, $f(x) = \log_a x$, $f(x) = e^x$, $f(x) = \ln x$.	Graphical Representations:
		Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
g.	Explore real phenomena related to exponential and	Expressions, Equations, & Inequalities:
	time.	Write expressions that require planning and/or manipulating to accurately model a situation
		Write equations and inequalities that require planning, manipulating, and/or solving
		Graphical Representations:
		Solve problems integrating multiple algebraic and/or geometric concepts
MA2A5. Students will solve a variety of equations and inequalities.		
а.	Find real and complex roots of higher degree polynomial equations using the factor theorem, remainder theorem, rational root theorem, and fundamental theorem of algebra, incorporating complex and radical conjugates.	
b.	Solve polynomial, exponential, and logarithmic	Numbers: Concepts & Properties:
	equations analytically, graphically, and using appropriate technology.	Exhibit knowledge of logarithms and geometric sequences

GEORGIA Accelerated Math 2 Performance Standards		ACT Mathematics College Readiness Standards
C.	Solve polynomial, exponential, and logarithmic	Numbers: Concepts & Properties:
	inequalities analytically, graphically, and using appropriate technology. Represent solution sets of inequalities using interval notation.	Exhibit knowledge of logarithms and geometric sequences
d.	Solve a variety of types of equations by appropriate	Expressions, Equations, & Inequalities:
	means choosing among mental calculation, pencil and paper, or appropriate technology.	Solve equations in the form $x + a = b$, where a and b are whole numbers or decimals
		Solve one-step equations having integer or decimal answers
		Solve routine first-degree equations
		Solve real-world problems using first-degree equations
		Solve absolute value equations
		Solve quadratic equations
MA	2A6. Students will perform basic operations with	
ma	trices.	
а.	possible, choosing appropriate methods, including technology.	
b.	Find the inverses of two-by-two matrices using pencil and paper, and find inverses of larger matrices using technology.	
C.	Examine the properties of matrices, contrasting them with properties of real numbers.	
MA2A7. Students will use matrices to formulate and solve problems.		
а.	Represent a system of linear equations as a matrix equation.	
b.	Solve matrix equations using inverse matrices.	
C.	Represent and solve realistic problems using systems	Expressions, Equations, & Inequalities:
	of linear equations.	Find solutions to systems of linear equations
		Write expressions that require planning and/or manipulating to accurately model a situation
		Write equations and inequalities that require planning, manipulating, and/or solving
MA2A8. Students will solve linear programming problems in two variables.		
а.	Solve systems of inequalities in two variables, showing the solutions graphically.	
b.	Represent and solve realistic problems using linear	Graphical Representations:
	programming.	Solve problems integrating multiple algebraic and/or geometric concepts
MA rep	2A9. Students will understand and apply matrix resentations of vertex-edge graphs.	
а.	Use graphs to represent realistic situations.	
b.	Use matrices to represent graphs, and solve problems	Graphical Representations:
	that can be represented by graphs.	Solve problems integrating multiple algebraic and/or geometric concepts

GEORGIA Accelerated Math 2 Performance Standards

ACT Mathematics College Readiness Standards

GEOMETRY		
Students will explore right triangles and right triangular trigonometry. They will understand and apply properties of conic sections, planes, and spheres.		
MA2G1. Students will identify and use special right triangles.		
a. Determine the lengths of sides of 30°-60°-90° triangles.	Properties of Plane Figures:	
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles	
b. Determine the lengths of sides of 45°-45°-90° triangles.	Properties of Plane Figures:	
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles	
MA2G2. Students will define and apply sine, cosine, and tangent ratios to right triangles.		
a. Discover the relationship of the trigonometric ratios for	Properties of Plane Figures:	
similar triangles.	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles	
	Functions:	
	Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths	
b. Explain the relationship between the trigonometric	Functions:	
ratios of complementary angles.	Use trigonometric concepts and basic identities to solve problems	
c. Solve application problems using the trigonometric	Functions:	
ratios.	Apply basic trigonometric ratios to solve right-triangle problems	
MA2G3. Students will investigate the relationships between lines and circles.		
a. Find equations of circles.	Graphical Representations:	
	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)	
b. Graph a circle given an equation in general form.	Graphical Representations:	
	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
c. Find the equation of a tangent line to a circle at a given	Graphical Representations:	
point.	Solve problems integrating multiple algebraic and/or geometric concepts	
d. Solve a system of equations involving a circle and a	Graphical Representations:	
line.	Solve problems integrating multiple algebraic and/or geometric concepts	
e. Solve a system of equations involving two circles.	Graphical Representations:	
	Solve problems integrating multiple algebraic and/or geometric concepts	

GEORGIA Accelerated Math 2 Performance Standards	ACT Mathematics College Readiness Standards	
MA2G4. Students will recognize, analyze, and graph the equations of the conic sections (parabolas, circles, ellipses, and hyperbolas).		
a. Convert equations of conics by completing the square.	Expressions, Equations, & Inequalities:	
	Manipulate expressions and equations	
	Graphical Representations:	
	Solve problems integrating multiple algebraic and/or geometric concepts	
b. Graph conic sections, identifying fundamental	Graphical Representations:	
	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$	
c. Write equations of conic sections given appropriate	Expressions, Equations, & Inequalities:	
information.	Write equations and inequalities that require planning, manipulating, and/or solving	
	Graphical Representations:	
	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)	
MA2G5. Students will investigate planes and spheres.		
a. Plot the point (<i>x</i> , <i>y</i> , <i>z</i>) and understand it as a vertex of a rectangular prism.		
b. Apply the distance formula in 3-space.	Graphical Representations:	
	Use the distance formula	
c. Recognize and understand equations of planes and spheres.		
DATA ANALYSIS AND PROBABILITY		
Students will make informal inferences about means and standard deviations. Students will use a normal distribution to calculate probabilities. Students will organize, represent, investigate, interpret, and make inferences from both observational studies and experiments.		
MA2D1. Using sample data, students will make informal inferences about population means and standard deviations.		
a. Pose a question and collect sample data from at least two different populations.		
b. Understand and calculate the means and standard	Probability, Statistics, & Data Analysis:	
deviations of sets of data.	Calculate the average of a list of positive whole numbers	
	Calculate the average of a list of numbers	
	Calculate the average, given the number of data values and the sum of the data values	
	Perform computations on data from tables and graphs	
	Calculate the average, given the frequency counts of all the data values	
c. Use means and standard deviations to compare data	Probability, Statistics, & Data Analysis:	
<u> うぜしろ.</u>	Analyze and draw conclusions based on information from figures, tables, and graphs	

GEORGIA Accelerated Math 2 Performance Standards	ACT Mathematics College Readiness Standards	
d. Compare the means and standard deviations of random samples with the corresponding population parameters. Observe that the different sample means vary from one sample to the next. Observe that the distribution of the sample means has less variability than the population distribution.	Probability, Statistics, & Data Analysis: Analyze and draw conclusions based on information from figures, tables, and graphs	
MA2D2. Students will create probability histograms of discrete random variables, using both experimental and theoretical probabilities.	Probability, Statistics, & Data Analysis: Translate from one representation of data to another (e.g., a bar graph to a circle graph)	
MA2D3. Students will solve problems involving probabilities by interpreting a normal distribution as a probability histogram for a continuous random variable (<i>z</i> -scores are used for a general normal distribution).		
a. Determine intervals about the mean that include a given percent of data.	Probability, Statistics, & Data Analysis:	
	figures, tables, and graphs	
b. Determine the probability that a given value falls within	Probability, Statistics, & Data Analysis:	
a specified interval.	Compute a probability when the event and/or sample space are not given or obvious	
c. Estimate how many items in a population fall within a	Probability, Statistics, & Data Analysis:	
specified interval.	Interpret and use information from figures, tables, and graphs	
MA2D4. Students will understand the differences between experimental and observational studies by posing questions and collecting, analyzing, and interpreting data.		
PROCESS STANDARDS		
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.		
MA2P1. Students will solve problems (using appropriate technology).		
a. Build new mathematical knowledge through problem solving.		



GEORGIA Accelerated Math 2 Performance Standards	ACT Mathematics College Readiness Standards
b. Solve problems that arise in mathematics and in other	Basic Operations & Applications:
contexts.	Perform one-operation computation with whole numbers and decimals
	Solve problems in one or two steps using whole numbers
	Perform common conversions (e.g., inches to feet or hours to minutes)
	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent
	Solve some routine two-step arithmetic problems
	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average
	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)
	Solve word problems containing several rates, proportions, or percentages
	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)
	Probability, Statistics, & Data Analysis:
	Calculate the average of a list of positive whole numbers
	Perform a single computation using information from a table or chart
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Read tables and graphs
	Perform computations on data from tables and graphs
	Use the relationship between the probability of an event and the probability of its complement
	Calculate the missing data value, given the average and all data values but one
	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Determine the probability of a simple event
	Exhibit knowledge of simple counting techniques
	Calculate the average, given the frequency counts of all the data values
	Manipulate data from tables and graphs
	Compute straightforward probabilities for common situations
	Use Venn diagrams in counting
	Calculate or use a weighted average
	Interpret and use information from figures, tables, and graphs

GEORGIA Accelerated Math 2 Performance Standards	ACT Mathematics College Readiness Standards
	Apply counting techniques
	Compute a probability when the event and/or sample space are not given or obvious
	Distinguish between mean, median, and mode for a list of numbers
	Analyze and draw conclusions based on information from figures, tables, and graphs
	Exhibit knowledge of conditional and joint probability
	Numbers: Concepts & Properties:
	Recognize equivalent fractions and fractions in lowest terms
	Recognize one-digit factors of a number
	Identify a digit's place value
	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	Find and use the least common multiple
	Order fractions
	Work with numerical factors
	Work with scientific notation
	Work with squares and square roots of numbers
	Work problems involving positive integer exponents
	Work with cubes and cube roots of numbers
	Determine when an expression is undefined
	Exhibit some knowledge of the complex numbers
	Apply number properties involving prime factorization
	Apply number properties involving even/odd numbers and factors/multiples
	Apply number properties involving positive/negative numbers
	Apply rules of exponents
	Multiply two complex numbers
	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
	Exhibit knowledge of logarithms and geometric sequences
	Apply properties of complex numbers
	Expressions, Equations, & Inequalities:
	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)
	Solve equations in the form $x + a = b$, where <i>a</i> and <i>b</i> are whole numbers or decimals
	Substitute whole numbers for unknown quantities to evaluate expressions

GEORGIA Accelerated Math 2	ACT Mathematics
Performance Standards	College Readiness Standards
	Solve one-step equations having integer or decimal answers
	Combine like terms (e.g., $2x + 5x$)
	Evaluate algebraic expressions by substituting integers for unknown quantities
	Add and subtract simple algebraic expressions
	Solve routine first-degree equations
	Perform straightforward word-to-symbol translations
	Multiply two binomials
	Solve real-world problems using first-degree equations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Identify solutions to simple quadratic equations
	Add, subtract, and multiply polynomials
	Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)
	Solve first-degree inequalities that do not require reversing the inequality sign
	Manipulate expressions and equations
	Write expressions, equations, and inequalities for common algebra settings
	Solve linear inequalities that require reversing the inequality sign
	Solve absolute value equations
	Solve quadratic equations
	Find solutions to systems of linear equations
	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Solve simple absolute value inequalities
	Graphical Representations:
	Identify the location of a point with a positive coordinate on the number line
	Locate points on the number line and in the first quadrant
	Locate points in the coordinate plane
	Comprehend the concept of length on the number line
	Exhibit knowledge of slope
	Identify the graph of a linear inequality on the number line
	Determine the slope of a line from points or equations
	Match linear graphs with their equations
	Interpret and use information from such that are the
	plane

GEORGIA Accelerated Math 2	ACT Mathematics
Performance Standards	College Readiness Standards
	inequalities
	Use the distance formula
	Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point
	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)
	Match number line graphs with solution sets of simple quadratic inequalities
	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
	Solve problems integrating multiple algebraic and/or geometric concepts
	Analyze and draw conclusions based on information from graphs in the coordinate plane
	Properties of Plane Figures:
	Exhibit some knowledge of the angles associated with parallel lines
	Find the measure of an angle using properties of parallel lines
	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
	Use several angle properties to find an unknown angle measure
	Recognize Pythagorean triples
	Use properties of isosceles triangles
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
	Use the Pythagorean theorem
	Draw conclusions based on a set of conditions
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
	Use relationships among angles, arcs, and distances in a circle
	Measurement:
	Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
	Compute the perimeter of polygons when all side lengths are given
	Compute the area of rectangles when whole number dimensions are given
	Compute the area and perimeter of triangles and rectangles in simple problems
	Use geometric formulas when all necessary information is given
	Compute the area of triangles and rectangles when one or more additional simple steps are required

GEORGIA Accelerated Math 2 Performance Standards	ACT Mathematics College Readiness Standards
	Compute the area and circumference of circles after identifying necessary information
	Compute the perimeter of simple composite geometric figures with unknown side lengths
	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure
	Use scale factors to determine the magnitude of a size change
	Compute the area of composite geometric figures when planning or visualization is required
	Functions:
	Evaluate quadratic functions, expressed in function notation, at integer values
	Evaluate polynomial functions, expressed in function notation, at integer values
	Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
	Evaluate composite functions at integer values
	Apply basic trigonometric ratios to solve right-triangle problems
	Write an expression for the composite of two simple functions
	Use trigonometric concepts and basic identities to solve problems
	Exhibit knowledge of unit circle trigonometry
	Match graphs of basic trigonometric functions with their equations
c. Apply and adapt a variety of appropriate strategies to	Expressions, Equations, & Inequalities:
solve problems.	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Graphical Representations:
	Solve problems integrating multiple algebraic and/or geometric concepts
	Properties of Plane Figures:
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
d. Monitor and reflect on the process of mathematical problem solving.	
MA2P2. Students will reason and evaluate mathematical arguments.	
a. Recognize reasoning and proof as fundamental aspects of mathematics.	
TABLE S

GEORGIA Accelerated Math 2 Performance Standards		ACT Mathematics College Readiness Standards
b.	Make and investigate mathematical conjectures.	Probability, Statistics, & Data Analysis:
		Analyze and draw conclusions based on information from figures, tables, and graphs
		Numbers: Concepts & Properties:
		Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
		Graphical Representations:
		Analyze and draw conclusions based on information from graphs in the coordinate plane
		Properties of Plane Figures:
		Draw conclusions based on a set of conditions
C.	Develop and evaluate mathematical arguments and	Probability, Statistics, & Data Analysis:
	proofs.	Analyze and draw conclusions based on information from figures, tables, and graphs
		Numbers: Concepts & Properties:
		Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
		Graphical Representations: Analyze and draw conclusions based on information from graphs in the coordinate plane Properties of Plane Figures:
		Draw conclusions based on a set of conditions
d.	Select and use various types of reasoning and methods	Numbers: Concepts & Properties:
	of proof.	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
		Properties of Plane Figures:
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
MA	2P3. Students will communicate mathematically.	
a.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
C.	Analyze and evaluate the mathematical thinking and strategies of others.	
d.	Use the language of mathematics to express	Expressions, Equations, & Inequalities:
	mathematical ideas precisely.	Perform straightforward word-to-symbol translations
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
		Write expressions that require planning and/or manipulating to accurately model a situation
		Write equations and inequalities that require planning, manipulating, and/or solving

TABLE S

GEORGIA Accelerated Math 2 Performance Standards		ACT Mathematics College Readiness Standards
MA2P4. Students will make connections among mathematical ideas and to other disciplines.		
a.	Recognize and use connections among mathematical	Properties of Plane Figures:
	ideas.	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.	
C.	Recognize and apply mathematics in contexts outside of mathematics.	
MA way	2P5. Students will represent mathematics in multiple ys.	
a.	Create and use representations to organize, record,	Probability, Statistics, & Data Analysis:
	and communicate mathematical ideas.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
b.	Select, apply, and translate among mathematical	Basic Operations & Applications:
	representations to solve problems.	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings) Probability, Statistics, & Data Analysis:
		Interpret and use information from figures, tables, and graphs
		Analyze and draw conclusions based on information from figures, tables, and graphs
		Expressions, Equations, & Inequalities:
		Write equations and inequalities that require planning, manipulating, and/or solving
		Graphical Representations:
		Solve problems integrating multiple algebraic and/or geometric concepts
		Properties of Plane Figures:
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
C.	Use representations to model and interpret physical,	Probability, Statistics, & Data Analysis:
	social, and mathematical phenomena.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
		Manipulate data from tables and graphs
		Interpret and use information from figures, tables, and graphs
		Analyze and draw conclusions based on information from figures, tables, and graphs
		Expressions, Equations, & Inequalities:
		Perform straightforward word-to-symbol translations

GEORGIA Accelerated Math 2 Performance Standards	ACT Mathematics College Readiness Standards
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Write expressions, equations, and inequalities for common algebra settings
	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Graphical Representations:
	Analyze and draw conclusions based on information from graphs in the coordinate plane
MATH READING CONTENT	

Stu	Students will enhance reading in all curriculum areas by:	
a.	Reading in all curriculum areas	
	• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas	
	• Read both informational and fictional texts in a variety of genres and modes of discourse	
	Read technical texts related to various subject areas	
b.	Discussing books	
	 Discuss messages and themes from books in all subject areas. 	
	 Respond to a variety of texts in multiple modes of discourse. 	
	 Relate messages and themes from one subject area to messages and themes in another area. 	
	• Evaluate the merit of texts in every subject discipline.	
	 Examine author's purpose in writing. 	
	 Recognize the features of disciplinary texts. 	
C.	Building vocabulary knowledge	
	 Demonstrate an understanding of contextual vocabulary in various subjects. 	
	 Use content vocabulary in writing and speaking. 	
	 Explore understanding of new words found in subject area texts. 	
d.	Establishing context	
	 Explore life experiences related to subject area content. 	
	 Discuss in both writing and speaking how certain words are subject area related. 	
	 Determine strategies for finding content and contextual meaning for unknown words. 	

GE Sta	ORGIA Accelerated Math 2 andards	ACT's WorkKeys Applied Mathematics Level Skills
AL	GEBRA	
Stu pol and pro	dents will investigate exponential, logarithmic, and ynomial functions of higher degree; understand matrices d use them to solve problems; and solve linear gramming problems in two variables.	
MA	2A1. Students will explore exponential functions.	
a.	Extend properties of exponents to include all integer exponents.	
b.	Investigate and explain characteristics of exponential functions, including domain and range, asymptotes, zeros, intercepts, intervals of increase and decrease, rates of change, and end behavior.	
C.	Graph functions as transformations of $f(x) = a^{x}$.	
d.	Solve simple exponential equations and inequalities analytically, graphically, and by using appropriate	Calculate perimeters and areas of basic shapes (rectangles and circles)
	technology.	Rearrange a formula before solving a problem
		Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
		Find the volume of rectangular solids
		Calculate multiple areas and volumes of spheres, cylinders, or cones
e.	Understand and <mark>use basic exponential functions as models of real phenomena.</mark>	Decide what information, calculations, or unit conversions to use to solve the problem
f.	Understand and recognize geometric sequences as exponential functions with domains that are sets of whole numbers.	
g.	Interpret the constant ratio in a geometric sequence as the base of the associated exponential function.	
MA	2A2. Students will explore inverses of functions.	
a.	Discuss the characteristics of functions and their inverses, including one-to-oneness, domain, and range.	
b.	Determine inverses of linear, quadratic, and power	
	functions and functions of the form $f(x) = \frac{a}{x}$, including	
	the use of restricted domains.	
C.	Explore the graphs of functions and their inverses.	
d.	Use composition to verify that functions are inverses of each other.	
MA fun	2A3. Students will analyze graphs of polynomial ctions of higher degree.	
a.	Graph simple polynomial functions as translations of the function $f(x) = ax^n$.	
b.	Understand the effects of the following on the graph of a polynomial function: degree, lead coefficient, and multiplicity of real zeros.	
C.	Determine whether a polynomial function has symmetry and whether it is even, odd, or neither.	

GE Sta	EORGIA Accelerated Math 2 andards	ACT's WorkKeys Applied Mathematics Level Skills
d.	Investigate and explain characteristics of polynomial functions, including domain and range, intercepts, zeros, relative and absolute extrema, intervals of increase and decrease, and end behavior.	
MA inv	2A4. Students will explore logarithmic functions as erses of exponential functions.	
a.	Define and understand the properties of <i>n</i> th roots.	
b.	Extend properties of exponents to include rational exponents.	
C.	Define logarithmic functions as inverses of exponential functions.	
d.	Understand and use properties of logarithms by extending laws of exponents.	
e.	Investigate and explain characteristics of exponential and logarithmic functions including domain and range, asymptotes, zeros, intercepts, intervals of increase and decrease, and rate of change.	
f.	Graph functions as transformations of $f(x) = a^x$, $f(x) = \log_a x$, $f(x) = e^x$, $f(x) = \ln x$.	
g.	Explore real phenomena related to exponential and logarithmic functions including half-life and doubling	Calculate perimeters and areas of basic shapes (rectangles and circles)
	time.	Rearrange a formula before solving a problem
		Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
		Find the volume of rectangular solids
		Calculate multiple areas and volumes of spheres, cylinders, or cones
MA2A5. Students will solve a variety of equations and inequalities.		
a.	Find real and complex roots of higher degree polynomial equations using the factor theorem, remainder theorem, rational root theorem, and fundamental theorem of algebra, incorporating complex and radical conjugates.	
b.	Solve polynomial, exponential, and logarithmic equations analytically, graphically, and using appropriate technology.	
C.	Solve polynomial, exponential, and logarithmic inequalities analytically, graphically, and using appropriate technology. Represent solution sets of inequalities using interval notation.	

GEORGIA Accelerated Math 2 Standards		ACT's WorkKeys Applied Mathematics Level Skills
d.	Solve a variety of types of equations by appropriate means choosing among mental calculation, pencil and	Put the information in the right order before performing calculations
	paper, or appropriate technology.	Decide what information, calculations, or unit conversions to use to solve the problem
		Look up a formula and perform single-step conversions within or between systems of measurement
		Rearrange a formula before solving a problem
		Solve problems that include nonlinear functions and/or that involve more than one unknown
		Set up and manipulate complex ratios or proportions
MA ma	2A6. Students will perform basic operations with trices.	
a.	Add, subtract, multiply, and invert matrices, when possible, choosing appropriate methods, including technology.	
b.	Find the inverses of two-by-two matrices using pencil and paper, and find inverses of larger matrices using technology.	
C.	Examine the properties of matrices, contrasting them with properties of real numbers.	
MA pro	2A7. Students will use matrices to formulate and solve blems.	
a.	Represent a system of linear equations as a matrix equation.	
b.	Solve matrix equations using inverse matrices.	
C.	Represent and solve realistic problems using systems of linear equations.	
MA in t	2A8. Students will solve linear programming problems wo variables.	
a.	Solve systems of inequalities in two variables, showing the solutions graphically.	
b.	Represent and solve realistic problems using linear programming.	
MA rep	2A9. Students will understand and apply matrix resentations of vertex-edge graphs.	
a.	Use graphs to represent realistic situations.	
b.	Use matrices to represent graphs, and solve problems that can be represented by graphs.	
GE	OMETRY	
Stu trig cor	dents will explore right triangles and right triangular onometry. They will understand and apply properties of hic sections, planes, and spheres.	
MA tria	2G1. Students will identify and use special right ngles.	
a.	Determine the lengths of sides of 30°-60°-90° triangles.	
b.	Determine the lengths of sides of 45°-45°-90° triangles.	

GEORGIA Accelerated Math 2 Standards		ACT's WorkKeys Applied Mathematics Level Skills
MA2G2. Students will define and apply sine, cosine, and tangent ratios to right triangles.		
a.	Discover the relationship of the trigonometric ratios for similar triangles.	
b.	Explain the relationship between the trigonometric ratios of complementary angles.	
C.	Solve application problems using the trigonometric ratios.	
MA line	2G3. Students will investigate the relationships between es and circles.	
a.	Find equations of circles.	
b.	Graph a circle given an equation in general form.	
C.	Find the equation of a tangent line to a circle at a given point.	
d.	Solve a system of equations involving a circle and a line.	
e.	Solve a system of equations involving two circles.	
MA equ and	2G4. Students will recognize, analyze, and graph the uations of the conic sections (parabolas, circles, ellipses, d hyperbolas).	
a.	Convert equations of conics by completing the square.	
b.	Graph conic sections, identifying fundamental characteristics.	
C.	Write equations of conic sections given appropriate information.	
MA	2G5. Students will investigate planes and spheres.	
a.	Plot the point (x, y, z) and understand it as a vertex of a rectangular prism.	
b.	Apply the distance formula in 3-space.	
C.	Recognize and understand equations of planes and spheres.	
DA	ATA ANALYSIS AND PROBABILITY	
Stu sta to o inv obs	idents will make informal inferences about means and ndard deviations. Students will use a normal distribution calculate probabilities. Students will organize, represent, estigate, interpret, and make inferences from both servational studies and experiments.	
MA infe dev	2D1. Using sample data, students will make informal erences about population means and standard viations.	
a.	Pose a question and collect sample data from at least two different populations.	
b.	Understand and calculate the means and standard deviations of sets of data.	
C.	Use means and standard deviations to compare data sets.	

GEORGIA Accelerated Math 2 Standards	ACT's WorkKeys Applied Mathematics Level Skills
d. Compare the means and standard deviations of random samples with the corresponding population parameters. Observe that the different sample means vary from one sample to the next. Observe that the distribution of the sample means has less variability than the population distribution.	
MA2D2. Students will create probability histograms of discrete random variables, using both experimental and theoretical probabilities.	
MA2D3. Students will solve problems involving probabilities by interpreting a normal distribution as a probability histogram for a continuous random variable (z-scores are used for a general normal distribution).	
a. Determine intervals about the mean that include a given percent of data.	
b. Determine the probability that a given value falls within a specified interval.	
c. Estimate how many items in a population fall within a specified interval.	
MA2D4. Students will understand the differences between experimental and observational studies by posing questions and collecting, analyzing, and interpreting data.	
PROCESS STANDARDS	
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.	
MA2P1. Students will solve problems (using appropriate technology).	
a. Build new mathematical knowledge through problem solving.	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
	Put the information in the right order before performing calculations
	Decide what information, calculations, or unit conversions to use to solve the problem
	Look up a formula and perform single-step conversions within or between systems of measurement
	Find the best deal using one- and two-step calculations and then comparing results
	Calculate perimeters and areas of basic shapes (rectangles and circles)
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem
	Use two formulas to change from one unit to another within the same system of measurement

GEORGIA Accelerated Math 2 Standards	ACT's WorkKeys Applied Mathematics Level Skills
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
	Find the volume of rectangular solids
	Calculate multiple rates
	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages Calculate multiple areas and volumes of spheres, cylinders.
	or cones
	Set up and manipulate complex ratios or proportions
	Find the best deal when there are several choices
b. Solve problems that arise in mathematics and in other contexts.	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
	Put the information in the right order before performing calculations
	Decide what information, calculations, or unit conversions to use to solve the problem
	Look up a formula and perform single-step conversions within or between systems of measurement
	Find the best deal using one- and two-step calculations and then comparing results
	Calculate perimeters and areas of basic shapes (rectangles and circles)
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem
	Use two formulas to change from one unit to another within the same system of measurement
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
	Find the volume of rectangular solids
	Calculate multiple rates
	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
	Calculate multiple areas and volumes of spheres, cylinders, or cones
	Set up and manipulate complex ratios or proportions
	Find the best deal when there are several choices

GEORGIA Accelerated Math 2 Standards	ACT's WorkKeys Applied Mathematics Level Skills
 Apply and adapt a variety of appropriate strategies to solve problems. 	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
	Put the information in the right order before performing calculations
	Decide what information, calculations, or unit conversions to use to solve the problem
	Look up a formula and perform single-step conversions within or between systems of measurement
	Find the best deal using one- and two-step calculations and then comparing results
	Calculate perimeters and areas of basic shapes (rectangles and circles)
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem
	Use two formulas to change from one unit to another within the same system of measurement
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
	Find the volume of rectangular solids
	Calculate multiple rates
	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
	Calculate multiple areas and volumes of spheres, cylinders, or cones
	Set up and manipulate complex ratios or proportions
	Find the best deal when there are several choices
 Monitor and reflect on the process of mathematical problem solving. 	Find mistakes in items that belong at Levels 3, 4, and 5 Find mistakes in Level 6 items
MA2P2. Students will reason and evaluate mathematical arguments.	
a. Recognize reasoning and proof as fundamental aspects of mathematics.	
b. Make and investigate mathematical conjectures.	Rearrange a formula before solving a problem Solve problems that include nonlinear functions and/or that involve more than one unknown Set up and manipulate complex ratios or proportions
 Develop and evaluate mathematical arguments and proofs. 	
d. Select and use various types of reasoning and methods of proof.	

GEORGIA Accelerated Math 2 Standards	ACT's WorkKeys Applied Mathematics Level Skills	
MA2P3. Students will communicate mathematically.		
a. Organize and consolidate their mathematical thinking through communication.		
 b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others. 		
c. Analyze and evaluate the mathematical thinking and	Find mistakes in items that belong at Levels 3, 4, and 5	
strategies of others.	Find mistakes in Level 6 items	
	Find the best deal when there are several choices	
d. Use the language of mathematics to express mathematical ideas precisely.		
MA2P4. Students will make connections among mathematical ideas and to other disciplines.		
 Recognize and use connections among mathematical ideas. 		
b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.		
c. Recognize and apply mathematics in contexts outside of mathematics.	Decide what information, calculations, or unit conversions to use to solve the problem	
MA2P5. Students will represent mathematics in multiple ways.		
a. Create and use representations to organize, record, and communicate mathematical ideas.		
 Select, apply, and translate among mathematical representations to solve problems. 	Put the information in the right order before performing calculations	
	Decide what information, calculations, or unit conversions to use to solve the problem	
c. Use representations to model and interpret physical, social, and mathematical phenomena.		
MATH READING CONTENT		
Students will enhance reading in all curriculum areas by:		
a. Reading in all curriculum areas		
 Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas 		
 Read both informational and fictional texts in a variety of genres and modes of discourse 		
Read technical texts related to various subject areas		

GEORGIA Accelerated Math 2 Standards		ACT's WorkKeys Applied Mathematics Level Skills
b.	Discussing books	
	 Discuss messages and themes from books in all subject areas. 	
	 Respond to a variety of texts in multiple modes of discourse. 	
	 Relate messages and themes from one subject area to messages and themes in another area. 	
	Evaluate the merit of texts in every subject discipline.	
	 Examine author's purpose in writing. 	
	Recognize the features of disciplinary texts.	
C.	Building vocabulary knowledge	
	 Demonstrate an understanding of contextual vocabulary in various subjects. 	
	 Use content vocabulary in writing and speaking. 	
	 Explore understanding of new words found in subject area texts. 	
d.	Establishing context	
	 Explore life experiences related to subject area content. 	
	 Discuss in both writing and speaking how certain words are subject area related. 	
	 Determine strategies for finding content and contextual meaning for unknown words. 	

GEORGIA Accelerated Math 3 Performance Standards

ACT Mathematics College Readiness Standards

ALGEBRA		
Students will explore characteristics of various functions, understand and use concepts of trigonometric functions, investigate and apply sequences and series, and use parametric and polar equations to represent functions and curves.		
MA	3A1. Students will explore rational functions.	
а.	Investigate and explain characteristics of rational functions, including domain, range, zeros, points of discontinuity, intervals of increase and decrease, rates of change, local and absolute extrema, symmetry, asymptotes, and end behavior.	Graphical Representations: Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
b.	Find inverses of rational functions, discussing domain and range, symmetry, and function composition.	Expressions, Equations, & Inequalities: Manipulate expressions and equations
C.	Solve rational equations and inequalities analytically, graphically, and by using appropriate technology.	
MA trig	3A2. Students will use the circle to define the onometric functions.	
a.	Define and understand angles measured in degrees and radians, including but not limited to 0°, 30°, 45°, 60°, 90°, their multiples, and equivalences.	Functions: Exhibit knowledge of unit circle trigonometry
b.	Understand and apply the six trigonometric functions as functions of general angles in standard position.	Functions: Exhibit knowledge of unit circle trigonometry
C.	Find values of trigonometric functions using points on the terminal sides of angles in the standard position.	Functions: Exhibit knowledge of unit circle trigonometry
d.	Understand and apply the six trigonometric functions as functions of arc length on the unit circle.	Functions: Exhibit knowledge of unit circle trigonometry
e.	Find values of trigonometric functions using the unit circle.	Functions: Exhibit knowledge of unit circle trigonometry
MA <mark>six</mark>	3A3. Students will investigate and use the graphs of the trigonometric functions.	
a.	Understand and apply the six basic trigonometric functions as functions of real numbers.	
b.	Determine the characteristics of the graphs of the six basic trigonometric functions.	Functions: Match graphs of basic trigonometric functions with their equations
C.	Graph transformations of trigonometric functions including changing period, amplitude, phase shift, and vertical shift.	
d.	Apply graphs of trigonometric functions in realistic contexts involving periodic phenomena.	
MA3A4. Students will investigate functions.		
a.	Compare and contrast properties of functions within and across the following types: linear, quadratic, polynomial, power, rational, exponential, logarithmic, trigonometric, and piecewise.	Numbers: Concepts & Properties: Exhibit knowledge of logarithms and geometric sequences Graphical Representations: Identify characteristics of graphs based on a set of conditions or on a general equation such as $v = ax^2 + c$

GEORGIA Accelerated Math 3 Performance Standards	ACT Mathematics College Readiness Standards
	Functions:
	Match graphs of basic trigonometric functions with their equations
b. Investigate transformations of functions.	
c. Investigate characteristics of functions built through sum, difference, product, quotient, and composition.	
MA3A5. Students will establish the identities below and use	Functions:
them to simplify trigonometric expressions and verify	Use trigonometric concepts and basic identities to solve
equivalence statements.	problems
$\tan \theta = \frac{\sin \theta}{\cos \theta}$	
$\cot\theta = \frac{\cos\theta}{\sin\theta}$	
$\sec\theta = \frac{1}{\cos\theta}$	
$\csc\theta = \frac{1}{\sin\theta}$	
$\sin^2\theta + \cos^2\theta = 1$	
$\cot^2\theta + 1 = \csc^2\theta$	
$\sin(\alpha \pm \beta) = \sin\alpha \cos\beta \pm \cos\alpha \sin\beta$	
sin(2A) = 2sinAcosA	
$\cos(2\theta) = \cos^2\theta - \sin^2\theta$	
MA3A6. Students will solve trigonometric equations both graphically and algebraically.	
Solve trigonometric equations over a variety of	Functions:
domains, using technology as appropriate.	Use trigonometric concepts and basic identities to solve problems
Use the coordinates of a point on the terminal side of	Functions:
an angle to express <i>x</i> as <i>r</i> cosθ and <i>y</i> as <i>r</i> sinθ.	Exhibit knowledge of unit circle trigonometry
d. Apply the law of sines and the law of cosines.	Functions:
	Use trigonometric concepts and basic identities to solve problems
MA3A7. Students will verify and apply $\frac{1}{2}$ ab sinC to find the	Functions:
area of a triangle.	Use trigonometric concepts and basic identities to solve problems
MA3A8. Students will investigate and use inverse sine, inverse cosine, and inverse tangent functions.	
a. Find values of the above functions using technology as	Functions:
appropriate.	Apply basic trigonometric ratios to solve right-triangle problems
	Use trigonometric concepts and basic identities to solve problems
b. Determine characteristics of the above functions and	Functions:
their graphs.	Match graphs of basic trigonometric functions with their equations

GEORGIA Accelerated Math 3 Performance Standards		ACT Mathematics College Readiness Standards	
MA	MA3A9. Students will use sequences and series		
a.	Use and find recursive and explicit formulae for the	Numbers: Concepts & Properties:	
	terms of sequences.	Exhibit knowledge of logarithms and geometric sequences	
		Expressions, Equations, & Inequalities:	
		Write expressions, equations, and inequalities for common	
		algebra settings	
b.	Recognize and use simple arithmetic and geometric	Numbers: Concepts & Properties:	
		Exhibit knowledge of logarithms and geometric sequences	
C.	Investigate limits of sequences.	Numbers: Concepts & Properties:	
		Exhibit knowledge of logarithms and geometric sequences	
а.	for sums of finite series.		
e.	Find and apply the sums of finite and, where appropriate, infinite arithmetic and geometric series.		
f.	Use summation notation to explore series.		
g.	Determine geometric series and their limits.		
MA	3A10. Students will understand and use vectors.		
a.	Represent vectors algebraically and geometrically.		
b.	Convert between vectors expressed using rectangular	Graphical Representations:	
	coordinates and vectors expressed using magnitude and direction.	Use the distance formula	
		Functions:	
		Apply basic trigonometric ratios to solve right-triangle problems	
		Use trigonometric concepts and basic identities to solve problems	
C.	Add and subtract vectors and compute scalar multiples of vectors.		
d.	Use vectors to solve realistic problems.	Graphical Representations:	
		Solve problems integrating multiple algebraic and/or geometric concepts	
		Properties of Plane Figures:	
		Use the Pythagorean theorem	
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas	
		Functions:	
		Apply basic trigonometric ratios to solve right-triangle problems	
		Use trigonometric concepts and basic identities to solve problems	
MA3A11. Students will use complex numbers in			
а. ,	Represent complex numbers in trigonometric form.		
b.	Find products, quotients, powers, and roots of complex numbers in trigonometric form.		

GEORGIA Accelerated Math 3 Performance Standards	ACT Mathematics College Readiness Standards	
MA3A12. Students will explore parametric representations of plane curves.		
a. Convert between Cartesian and parametric form.		
b. Graph equations in parametric form showing direction and beginning and ending points where appropriate.		
MA3A13. Students will explore polar equations.		
a. Express coordinates of points in rectangular and polar	Graphical Representations:	
torm.	Locate points in the coordinate plane	
	Functions:	
	Exhibit knowledge of unit circle trigonometry	
 Graph and identify characteristics of simple polar equations including lines, circles, cardioids, limaçons, and roses. 		
DATA ANALYSIS AND PROBABILITY		
Students will organize, represent, investigate, interpret, and make inferences from data, using the central limit theorem and the standard normal distribution. Students will apply the Central Limit Theorem to calculate confidence intervals for a population mean using data from large samples. Students will use sample data and confidence intervals to draw conclusions about populations.		
MA3D1. Using simulation, students will develop the idea of the central limit theorem.		
MA3D2. Using student-generated data from random samples of at least 30 members, students will determine the margin of error and confidence interval for a specified level of confidence.		
MA3D3. Students will use confidence intervals and margins of error to make inferences from data about a population. Technology is used to evaluate confidence intervals, but students will be aware of the ideas involved.		
PROCESS STANDARDS		
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.		
MA3P1. Students will solve problems (using appropriate technology).		
a. Build new mathematical knowledge through problem solving.		
b. Solve problems that arise in mathematics and in other	Basic Operations & Applications:	
contexts.	Perform one-operation computation with whole numbers and decimals	
	Solve problems in one or two steps using whole numbers	
	Perform common conversions (e.g., inches to feet or hours to minutes)	

GEORGIA Accelerated Math 3	ACT Mathematics
Performance Standards	College Readiness Standards
	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent
	Solve some routine two-step arithmetic problems
	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average
	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)
	Solve word problems containing several rates, proportions, or percentages
	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)
	Probability, Statistics, & Data Analysis:
	Calculate the average of a list of positive whole numbers
	Perform a single computation using information from a table or chart
	Calculate the average of a list of numbers
	Calculate the average, given the number of data values and the sum of the data values
	Read tables and graphs
	Perform computations on data from tables and graphs
	Use the relationship between the probability of an event and the probability of its complement
	Calculate the missing data value, given the average and all data values but one
	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Determine the probability of a simple event
	Exhibit knowledge of simple counting techniques
	Calculate the average, given the frequency counts of all the data values
	Manipulate data from tables and graphs
	Compute straightforward probabilities for common situations
	Use Venn diagrams in counting
	Calculate or use a weighted average
	Interpret and use information from figures, tables, and graphs
	Apply counting techniques
	Compute a probability when the event and/or sample space are not given or obvious
	Distinguish between mean, median, and mode for a list of numbers

GEORGIA Accelerated Math 3	ACT Mathematics
Performance Standards	College Readiness Standards
	Analyze and draw conclusions based on information from figures, tables, and graphs
	Exhibit knowledge of conditional and joint probability
	Numbers: Concepts & Properties:
	Recognize equivalent fractions and fractions in lowest terms
	Recognize one-digit factors of a number
	Identify a digit's place value
	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor
	Find and use the least common multiple
	Order fractions
	Work with numerical factors
	Work with scientific notation
	Work with squares and square roots of numbers
	Work problems involving positive integer exponents
	Work with cubes and cube roots of numbers
	Determine when an expression is undefined
	Exhibit some knowledge of the complex numbers
	Apply number properties involving prime factorization
	Apply number properties involving even/odd numbers and factors/multiples
	Apply number properties involving positive/negative numbers
	Apply rules of exponents
	Multiply two complex numbers
	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers
	Exhibit knowledge of logarithms and geometric sequences
	Apply properties of complex numbers
	Expressions, Equations, & Inequalities:
	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$)
	Solve equations in the form $x + a = b$, where <i>a</i> and <i>b</i> are whole numbers or decimals
	Substitute whole numbers for unknown quantities to evaluate expressions
	Solve one-step equations having integer or decimal answers
	Combine like terms (e.g., $2x + 5x$)
	Evaluate algebraic expressions by substituting integers for unknown quantities
	Add and subtract simple algebraic expressions
	Solve routine first-degree equations

GEORGIA Accelerated Math 3 Performance Standards	ACT Mathematics College Readiness Standards
	Perform straightforward word to symbol translations
	Multiply two binomials
	Solve real-world problems using first-degree equations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Identify solutions to simple guadratic equations
	Add, subtract, and multiply polynomials
	Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)
	Solve first-degree inequalities that do not require reversing the inequality sign
	Manipulate expressions and equations
	Write expressions, equations, and inequalities for common algebra settings
	Solve linear inequalities that require reversing the inequality sign
	Solve absolute value equations
	Solve quadratic equations
	Find solutions to systems of linear equations
	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving
	Solve simple absolute value inequalities
	Graphical Representations:
	Identify the location of a point with a positive coordinate on the number line
	Locate points on the number line and in the first quadrant
	Locate points in the coordinate plane
	Comprehend the concept of length on the number line
	Exhibit knowledge of slope
	Identify the graph of a linear inequality on the number line
	Determine the slope of a line from points or equations
	Match linear graphs with their equations
	Find the midpoint of a line segment
	Interpret and use information from graphs in the coordinate plane
	Match number line graphs with solution sets of linear inequalities
	Use the distance formula
	Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point
	Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)

GEORGIA Accelerated Math 3	ACT Mathematics
Performance Standards	College Readiness Standards
	Match number line graphs with solution sets of simple quadratic inequalities
	Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$
	Solve problems integrating multiple algebraic and/or geometric concepts
	Analyze and draw conclusions based on information from graphs in the coordinate plane
	Properties of Plane Figures:
	Exhibit some knowledge of the angles associated with parallel lines
	Find the measure of an angle using properties of parallel lines
	Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)
	Use several angle properties to find an unknown angle measure
	Recognize Pythagorean triples
	Use properties of isosceles triangles
	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles
	Use the Pythagorean theorem
	Draw conclusions based on a set of conditions
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
	Use relationships among angles, arcs, and distances in a circle
	Measurement:
	Estimate or calculate the length of a line segment based on other lengths given on a geometric figure
	Compute the perimeter of polygons when all side lengths are given
	Compute the area of rectangles when whole number dimensions are given
	Compute the area and perimeter of triangles and rectangles in simple problems
	Use geometric formulas when all necessary information is given
	Compute the area of triangles and rectangles when one or more additional simple steps are required
	Compute the area and circumference of circles after identifying necessary information
	Compute the perimeter of simple composite geometric figures with unknown side lengths
	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure
	Use scale factors to determine the magnitude of a size change

GEORGIA Accelerated Math 3 Performance Standards	ACT Mathematics College Readiness Standards	
	Compute the area of composite geometric figures when planning or visualization is required	
	Functions:	
	Evaluate quadratic functions, expressed in function notation, at integer values	
	Evaluate polynomial functions, expressed in function notation, at integer values	
	Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths	
	Evaluate composite functions at integer values	
	Apply basic trigonometric ratios to solve right-triangle problems	
	Write an expression for the composite of two simple functions	
	Use trigonometric concepts and basic identities to solve problems	
	Exhibit knowledge of unit circle trigonometry	
	Match graphs of basic trigonometric functions with their equations	
c. Apply and adapt a variety of appropriate strategies to	Expressions, Equations, & Inequalities:	
solve problems.	Write expressions that require planning and/or manipulating to accurately model a situation	
	Write equations and inequalities that require planning, manipulating, and/or solving	
	Graphical Representations:	
	Solve problems integrating multiple algebraic and/or geometric concepts	
	Properties of Plane Figures:	
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas	
 Monitor and reflect on the process of mathematical problem solving. 		
MA3P2. Students will reason and evaluate mathematical arguments.		
a. Recognize reasoning and proof as fundamental aspects of mathematics.		
b. Make and investigate mathematical conjectures.	Probability, Statistics, & Data Analysis:	
	Analyze and draw conclusions based on information from figures, tables, and graphs	
	Numbers: Concepts & Properties:	
	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers	
	Graphical Representations:	
	Analyze and draw conclusions based on information from graphs in the coordinate plane	

GEORGIA Accelerated Math 3 Performance Standards		ACT Mathematics College Readiness Standards	
		Properties of Plane Figures:	
		Draw conclusions based on a set of conditions	
C.	Develop and evaluate mathematical arguments and	Probability, Statistics, & Data Analysis:	
	proofs.	Analyze and draw conclusions based on information from figures, tables, and graphs	
		Numbers: Concepts & Properties:	
		Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers	
		Graphical Representations:	
		Analyze and draw conclusions based on information from graphs in the coordinate plane Properties of Plane Figures:	
		Draw conclusions based on a set of conditions	
d.	Select and use various types of reasoning and methods	Numbers: Concepts & Properties:	
	of proof.	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers	
		Properties of Plane Figures:	
		Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas	
MA	MA3P3. Students will communicate mathematically.		
a.	Organize and consolidate their mathematical thinking through communication.		
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.		
C.	Analyze and evaluate the mathematical thinking and strategies of others.		
d.	Use the language of mathematics to express	Expressions, Equations, & Inequalities:	
	mathematical ideas precisely.	Perform straightforward word-to-symbol translations	
		Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)	
		Write expressions that require planning and/or manipulating to accurately model a situation	
		Write equations and inequalities that require planning, manipulating, and/or solving	
MA3P4. Students will make connections among mathematical ideas and to other disciplines.			
a.	Recognize and use connections among mathematical	Properties of Plane Figures:	
	ideas.	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas	
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.		

GEORGIA Accelerated Math 3 Performance Standards	ACT Mathematics College Readiness Standards
c. Recognize and apply mathematics in contexts outside of mathematics.	
MA3P5. Students will represent mathematics in multiple ways.	
a. Create and use representations to organize, record,	Probability, Statistics, & Data Analysis:
and communicate mathematical ideas.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
b. Select, apply, and translate among mathematical	Basic Operations & Applications:
representations to solve problems.	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)
	Interpret and use information from figures, tables, and
	graphs
	Analyze and draw conclusions based on information from figures, tables, and graphs
	Expressions, Equations, & Inequalities:
	Write equations and inequalities that require planning, manipulating, and/or solving
	Graphical Representations:
	Solve problems integrating multiple algebraic and/or geometric concepts
	Properties of Plane Figures:
	Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas
c. Use representations to model and interpret physical,	Probability, Statistics, & Data Analysis:
social, and mathematical phenomena.	Translate from one representation of data to another (e.g., a bar graph to a circle graph)
	Manipulate data from tables and graphs
	Interpret and use information from figures, tables, and graphs
	Analyze and draw conclusions based on information from figures, tables, and graphs
	Expressions, Equations, & Inequalities:
	Perform straightforward word-to-symbol translations
	Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions)
	Write expressions, equations, and inequalities for common algebra settings
	Write expressions that require planning and/or manipulating to accurately model a situation
	Write equations and inequalities that require planning, manipulating, and/or solving

GI Pe	EORGIA Accelerated Math 3 erformance Standards	ACT Mathematics College Readiness Standards
		Graphical Representations:
		Analyze and draw conclusions based on information from graphs in the coordinate plane
M	ATH READING CONTENT	
Stu	udents will enhance reading in all curriculum areas by:	
a.	Reading in all curriculum areas	
	 Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas 	
	 Read both informational and fictional texts in a variety of genres and modes of discourse 	
	Read technical texts related to various subject areas	
b.	Discussing books	
	 Discuss messages and themes from books in all subject areas. 	
	 Respond to a variety of texts in multiple modes of discourse. 	
	 Relate messages and themes from one subject area to messages and themes in another area. 	
	• Evaluate the merit of texts in every subject discipline.	
	 Examine author's purpose in writing. 	
	 Recognize the features of disciplinary texts. 	
C.	Building vocabulary knowledge	
	 Demonstrate an understanding of contextual vocabulary in various subjects. 	
	 Use content vocabulary in writing and speaking. 	
	 Explore understanding of new words found in subject area texts. 	
d.	Establishing context	
	 Explore life experiences related to subject area content. 	
	 Discuss in both writing and speaking how certain words are subject area related. 	
	 Determine strategies for finding content and contextual meaning for unknown words. 	

GE Sta	ORGIA Accelerated Math 3 andards	ACT's WorkKeys Applied Mathematics Level Skills
AL	GEBRA	
Students will explore characteristics of various functions, understand and use concepts of trigonometric functions, investigate and apply sequences and series, and use parametric and polar equations to represent functions and curves.		
MA	3A1. Students will explore rational functions.	
a.	Investigate and explain characteristics of rational functions, including domain, range, zeros, points of discontinuity, intervals of increase and decrease, rates of change, local and absolute extrema, symmetry, asymptotes, and end behavior.	
b.	Find inverses of rational functions, discussing domain and range, symmetry, and function composition.	
C.	Solve rational equations and inequalities analytically, graphically, and by using appropriate technology.	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
		Decide what information, calculations, or unit conversions to use to solve the problem
		Use fractions, negative numbers, ratios, percentages, or mixed numbers
		Calculate multiple rates
		Solve problems that include nonlinear functions and/or that involve more than one unknown
		Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
		Set up and manipulate complex ratios or proportions
MA trig	3A2. Students will use the circle to define the onometric functions.	
a.	Define and understand angles measured in degrees and radians, including but not limited to 0°, 30°, 45°, 60°, 90°, their multiples, and equivalences.	
b.	Understand and apply the six trigonometric functions as functions of general angles in standard position.	
C.	Find values of trigonometric functions using points on the terminal sides of angles in the standard position.	
d.	Understand and apply the six trigonometric functions as functions of arc length on the unit circle.	
e.	Find values of trigonometric functions using the unit circle.	
MA six	3A3. Students will investigate and use the graphs of the trigonometric functions.	
a.	Understand and apply the six basic trigonometric functions as functions of real numbers.	
b.	Determine the characteristics of the graphs of the six basic trigonometric functions.	
C.	Graph transformations of trigonometric functions including changing period, amplitude, phase shift, and vertical shift.	

GEORGIA Accelerated Math 3 Standards	ACT's WorkKeys Applied Mathematics Level Skills
 Apply graphs of trigonometric functions in realistic contexts involving periodic phenomena. 	
MA3A4. Students will investigate functions.	
a. Compare and contrast properties of functions within and across the following types: linear, quadratic, polynomial, power, rational, exponential, logarithmic, trigonometric, and piecewise.	
b. Investigate transformations of functions.	
c. Investigate characteristics of functions built through sum, difference, product, quotient, and composition.	Solve problems that require a single type of mathematics operation (addition, subtraction, multiplication, and division) using whole numbers Add or subtract negative numbers Solve problems that require one or two operations Multiply negative numbers Divide negative numbers Put the information in the right order before performing
	calculations
MA3A5. Students will establish the identities below and use them to simplify trigonometric expressions and verify equivalence statements. $tan \theta = \frac{\sin \theta}{2}$	
$\frac{1}{\cos\theta}$	
$\cot\theta = \frac{\cos\theta}{\sin\theta}$	
$\sec\theta = \frac{1}{\cos\theta}$	
$csc\theta = \frac{1}{\sin \theta}$ $sin^{2}\theta + cos^{2}\theta = 1$ $cot^{2}\theta + 1 = csc^{2}\theta$ $sin(\alpha \pm \beta) = sin\alpha cos\beta \pm cos\alpha sin\beta$ $cos(\alpha \pm \beta) = cos\alpha cos\beta \pm sin\alpha sin\beta$ $sin(2\theta) = 2sin\theta cos\theta$ $cos(2\theta) = cos^{2}\theta - sin^{2}\theta$	
MA3A6. Students will solve trigonometric equations both graphically and algebraically	
a. Solve trigonometric equations over a variety of domains, using technology as appropriate.	
b. Use the coordinates of a point on the terminal side of an angle to express x as $r \cos\theta$ and y as $r \sin\theta$.	
d. Apply the law of sines and the law of cosines.	
MA3A7. Students will verify and apply $\frac{1}{2}$ <i>ab</i> sin <i>C</i> to find the	
area of a triangle.	
MA3A8. Students will investigate and use inverse sine, inverse cosine, and inverse tangent functions.	
a. Find values of the above functions using technology as appropriate.	
 Determine characteristics of the above functions and their graphs. 	

GE Sta	ORGIA Accelerated Math 3 andards	ACT's WorkKeys Applied Mathematics Level Skills
MA	3A9. Students will use sequences and series	
a.	Use and find recursive and explicit formulae for the terms of sequences.	
b.	Recognize and use simple arithmetic and geometric sequences.	
C.	Investigate limits of sequences.	
d.	Use mathematical induction to find and prove formulae for sums of finite series.	
e.	Find and apply the sums of finite and, where appropriate, infinite arithmetic and geometric series.	
f.	Use summation notation to explore series.	
g.	Determine geometric series and their limits.	
MA	3A10. Students will understand and use vectors.	
a.	Represent vectors algebraically and geometrically.	
b.	Convert between vectors expressed using rectangular coordinates and vectors expressed using magnitude and direction.	
C.	Add and subtract vectors and compute scalar multiples of vectors.	
d.	Use vectors to solve realistic problems.	
MA3A11. Students will use complex numbers in trigonometric form.		
a.	Represent complex numbers in trigonometric form.	
b.	Find products, quotients, powers, and roots of complex numbers in trigonometric form.	
MA3A12. Students will explore parametric representations of plane curves.		
а.	Convert between Cartesian and parametric form.	
b.	Graph equations in parametric form showing direction and beginning and ending points where appropriate.	
MA	3A13. Students will explore polar equations.	
a.	Express coordinates of points in rectangular and polar form.	
b.	Graph and identify characteristics of simple polar equations including lines, circles, cardioids, limaçons, and roses.	
DA	ATA ANALYSIS AND PROBABILITY	
Students will organize, represent, investigate, interpret, and make inferences from data, using the central limit theorem and the standard normal distribution. Students will apply the Central Limit Theorem to calculate confidence intervals for a population mean using data from large samples. Students will use sample data and confidence intervals to draw conclusions about populations.		

GEORGIA Accelerated Math 3 Standards	ACT's WorkKeys Applied Mathematics Level Skills	
MA3D1. Using simulation, students will develop the idea of the central limit theorem.		
MA3D2. Using student-generated data from random samples of at least 30 members, students will determine the margin of error and confidence interval for a specified level of confidence.		
MA3D3. Students will use confidence intervals and margins of error to make inferences from data about a population. Technology is used to evaluate confidence intervals, but students will be aware of the ideas involved.		
PROCESS STANDARDS		
The following process standards are essential to mastering each of the mathematics content standards. They emphasize critical dimensions of the mathematical proficiency that all students need.		
MA3P1. Students will solve problems (using appropriate technology).		
 Build new mathematical knowledge through problem solving. 	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages	
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals	
	Put the information in the right order before performing calculations	
	Decide what information, calculations, or unit conversions to use to solve the problem	
	Look up a formula and perform single-step conversions within or between systems of measurement	
	Find the best deal using one- and two-step calculations and then comparing results	
	Calculate perimeters and areas of basic shapes (rectangles and circles)	
	Calculate percentage discounts or markups	
	Use fractions, negative numbers, ratios, percentages, or mixed numbers	
	Rearrange a formula before solving a problem	
	Use two formulas to change from one unit to another within the same system of measurement	
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement	
	Find the best deal and use the result for another calculation	
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations	
	Find the volume of rectangular solids	
	Calculate multiple rates	
	fractions, mixed numbers, decimals, and/or percentages	
	Calculate multiple areas and volumes of spheres, cylinders, or cones	

GEORGIA Accelerated Math 3 Standards	ACT's WorkKeys Applied Mathematics Level Skills
	Set up and manipulate complex ratios or proportions
	Find the best deal when there are several choices
b. Solve problems that arise in mathematics and in other contexts.	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
	Put the information in the right order before performing calculations
	Decide what information, calculations, or unit conversions to use to solve the problem
	Look up a formula and perform single-step conversions within or between systems of measurement
	Find the best deal using one- and two-step calculations and then comparing results
	Calculate perimeters and areas of basic shapes (rectangles and circles)
	Calculate percentage discounts or markups
	Use fractions, negative numbers, ratios, percentages, or mixed numbers
	Rearrange a formula before solving a problem
	Use two formulas to change from one unit to another within the same system of measurement
	Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
	Find the best deal and use the result for another calculation
	Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
	Find the volume of rectangular solids
	Calculate multiple rates
	Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
	Calculate multiple areas and volumes of spheres, cylinders, or cones
	Set up and manipulate complex ratios or proportions
	Find the best deal when there are several choices
c. Apply and adapt a variety of appropriate strategies to solve problems.	Change numbers from one form to another using whole numbers, fractions, decimals, or percentages
	Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals
	Put the information in the right order before performing calculations
	Decide what information, calculations, or unit conversions to use to solve the problem
	Look up a formula and perform single-step conversions within or between systems of measurement
	Find the best deal using one- and two-step calculations and then comparing results
	Calculate perimeters and areas of basic shapes (rectangles

GE Sta	EORGIA Accelerated Math 3 andards	ACT's WorkKeys Applied Mathematics Level Skills
		and circles)
		Calculate percentage discounts or markups
		Use fractions, negative numbers, ratios, percentages, or mixed numbers
		Rearrange a formula before solving a problem
		Use two formulas to change from one unit to another within the same system of measurement
		Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement
		Find the best deal and use the result for another calculation
		Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations
		Find the volume of rectangular solids
		Calculate multiple rates
		Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages
		Calculate multiple areas and volumes of spheres, cylinders, or cones
		Set up and manipulate complex ratios or proportions
		Find the best deal when there are several choices
d.	Monitor and reflect on the process of mathematical problem solving.	Find mistakes in items that belong at Levels 3, 4, and 5 Find mistakes in Level 6 items
MA3P2. Students will reason and evaluate mathematical arguments.		
а.	Recognize reasoning and proof as fundamental aspects of mathematics.	
b.	Make and investigate mathematical conjectures.	Rearrange a formula before solving a problem Solve problems that include nonlinear functions and/or that involve more than one unknown Set up and manipulate complex ratios or proportions
C.	Develop and evaluate mathematical arguments and proofs.	
d.	Select and use various types of reasoning and methods of proof.	
MA3P3. Students will communicate mathematically.		
a.	Organize and consolidate their mathematical thinking through communication.	
b.	Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.	
C.	Analyze and evaluate the mathematical thinking and	Find mistakes in items that belong at Levels 3, 4, and 5
	strategies of others.	Find mistakes in Level 6 items
		Find the best deal when there are several choices
d.	Use the language of mathematics to express mathematical ideas precisely.	

GEORGIA Accelerated Math 3 Standards		ACT's WorkKeys Applied Mathematics Level Skills	
MA ma	MA3P4. Students will make connections among mathematical ideas and to other disciplines.		
a.	Recognize and use connections among mathematical ideas.		
b.	Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.		
C.	Recognize and apply mathematics in contexts outside of mathematics.	Decide what information, calculations, or unit conversions to use to solve the problem	
MA way	MA3P5. Students will represent mathematics in multiple ways.		
a.	Create and use representations to organize, record, and communicate mathematical ideas.		
b.	Select, apply, and translate among mathematical representations to solve problems.	Put the information in the right order before performing calculations	
		Decide what information, calculations, or unit conversions to use to solve the problem	
C.	Use representations to model and interpret physical, social, and mathematical phenomena.		
M	ATH READING CONTENT		
Stu	dents will enhance reading in all curriculum areas by:		
a.	Reading in all curriculum areas		
	• Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas		
	• Read both informational and fictional texts in a variety of genres and modes of discourse		
	Read technical texts related to various subject areas		
b.	Discussing books		
	 Discuss messages and themes from books in all subject areas. 		
	 Respond to a variety of texts in multiple modes of discourse. 		
	• Relate messages and themes from one subject area to messages and themes in another area.		
	• Evaluate the merit of texts in every subject discipline.		
	 Examine author's purpose in writing. 		
	Recognize the features of disciplinary texts.		
C.	Building vocabulary knowledge		
	 Demonstrate an understanding of contextual vocabulary in various subjects. 		
	 Use content vocabulary in writing and speaking. 		
	• Explore understanding of new words found in subject area texts.		

GEORGIA Accelerated Math 3 Standards		ACT's WorkKeys Applied Mathematics Level Skills
d.	Establishing context	
	 Explore life experiences related to subject area content. 	
	 Discuss in both writing and speaking how certain words are subject area related. 	
	 Determine strategies for finding content and contextual meaning for unknown words. 	