ACT® International Subject Tests

International Subject Test—Math 2 Practice Test

The ACT® International Subject Test—Math 2 Practice Test is an official AIST practice test. The full-length Math 2 Practice Test consists of items drawn from the International Subject Test Math 2 formative assessment pool and adheres to the AIST Math 2 Test Specifications.

This PDF file includes Math 2 Practice Test questions and answer keys. Taking the AIST Official full-length practice test is the best way to prepare for the two sessions of the AIST Math 2 test.

Math 2

60 Minutes—50 Questions

For each question, first decide which answer is correct. Then, click the circle next to your answer to select that answer. If you decide to change your answer, click the circle next to your new answer.

You are permitted to use an approved calculator on this test. You may use your calculator for any problems you choose. Some of the problems may require a calculator; some of the problems may best be solved without using a calculator. A Reference Sheet has been included in this Math 2 Practice Test, beginning on the next page.

Note: Unless otherwise indicated, all of the following assumptions apply to these problems.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word **line** indicates a straight line.
4. The word **average** indicates the arithmetic mean.

Your score will be based only on the number of questions you answer correctly during the time allowed. Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test. You will NOT be penalized for guessing. **It is to your advantage to answer every question even if you must guess.**

If you finish before time ends, you should use the time remaining to reconsider questions you are uncertain about.

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Math 2 Reference Sheet

Lines

Standard Form	$Ax + By = C$
Slope-Intercept Form	$y = mx + b$
Point-Slope Form	$y - y_1 = m(x - x_1)$
Slope	$m = \frac{y_2 - y_1}{x_2 - x_1}$

A, B, and C are constants, where $A \neq 0$ or $B \neq 0$.
m = slope
b = y-intercept
(x_1,y_1) and (x_2,y_2) are 2 points.

Quadratics

General Form	$ax^2 + bx + c = 0$
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

a, b, and c are constants, where $a \neq 0$.

Coordinate Geometry

Midpoint	$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$
Distance	$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

(x_1,y_1) and (x_2,y_2) are 2 points.

Area, Volume, and Surface Area of Polygons and Solids

Triangle	$A = \frac{1}{2}bh$
Parallelogram	$A = bh$
Trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$
Regular Polygon Prism	$A = \frac{1}{2}ap$
Right Prism	$V = Bh$
Circular Cylinder Right	$SA = 2B + Ph$
Circular Cylinder	$V = \pi r^2 h$
Pyramid	$SA = 2\pi r^2 + 2\pi rh$
Right Pyramid	$V = \frac{1}{3}Bh$
	$SA = B + \frac{1}{2}Ps$
Circular Cone	$V = \frac{1}{3}\pi r^2 h$
Right Circular Cone	$SA = \pi r^2 + \pi rs$
Sphere	$V = \frac{4}{3}\pi r^3$
	$SA = 4\pi r^2$

A = area
b = base
h = height
a = apothem
p = perimeter
V = volume
B = area of base
SA = surface area
P = perimeter of base
r = radius
s = slant height
$\pi \approx 3.14$

Circles

Center-Radius Form	$(x-h)^2+(y-k)^2=r^2$	center (h,k)
Area	$A=\pi r^2$	r = radius
Circumference	$C=\pi d=2\pi r$	A = area
Area of Sector	$A=\frac{\theta}{360}\pi r^2$	C = circumference d = diameter θ = degree measure of central angle $\pi \approx 3.14$

Parabolas

Opening vertically	$y=a(x-h)^2+k$	a = constant (h,k) = vertex
axis of symmetry	$x=h$	
focus	$\left(h,\ k+\frac{1}{4a}\right)$	
directrix	$x=k-\frac{1}{4a}$	
Opening horizontally	$x=a(y-k)^2+h$	
axis of symmetry	$y=k$	
focus	$\left(h+\frac{1}{4a},\ k\right)$	
directrix	$y=h-\frac{1}{4a}$	

Ellipses

Major Axis Horizontal	$\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$	a, b = positive constants where $a > b$
foci	$(h \pm c,\ k)$	$c=\sqrt{a^2+b^2}$
Major Axis Vertical	$\frac{(y-k)^2}{a^2}+\frac{(x-h)^2}{b^2}=1$	A = area
foci	$(h,\ k \pm c)$	$\pi \approx 3.14$
Area	$A=\pi ab$	

Hyperbolas

Transverse Axis Horizontal	$\frac{(x-h)^2}{a^2}-\frac{(y-k)^2}{b^2}=1$	a, b = positive constants where $a > b$
foci	$(h \pm c,\ k)$	$c=\sqrt{a^2+b^2}$
Transverse Axis Vertical	$\frac{(y-k)^2}{a^2}-\frac{(x-h)^2}{b^2}=1$	
foci	foci $(h,\ k \pm c)$	

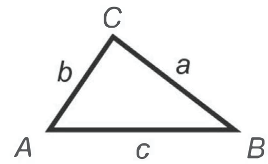
Triangles

Law of Sines $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Law of Cosines $c^2 = a^2 + b^2 - 2ab \cos C$

Area of a Triangle $\text{Area} = \frac{1}{2}bc \sin A$

$= \sqrt{s(s-a)(s-b)(s-c)}$



s = semiperimeter = $\frac{(a+b+c)}{2}$

Pythagorean Theorem $a^2 + b^2 = c^2$, if $\angle C$ is a right angle

Sequences and Series

Arithmetic Sequence	$a_n = a_1 + (n-1)d$	a_n = nth term
Arithmetic Series	$s_n = \frac{n}{2}(a_1 + a_n)$	n = term number
Geometric Sequence	$a_n = a_1(r^{n-1})$	d = common difference
Finite Geometric Series	$s_n = \frac{a_1 - a_1 r^n}{1-r}$ where $r \neq 1$	r = common ratio
Infinite Geometric Series	$s = \frac{a_1}{1-r}$ where $\lvert r \rvert < 1$	s_n = sum of the first n terms
Combinations	${}_kC_m = C(k,m) = \frac{k!}{(k-m)!\,m!}$	s = sum of all the terms
Permutations	${}_kP_m = P(k,m) = \frac{k!}{(k-m)!}$	k = number of objects in the set
		m = number of objects selected

Interest

Simple Interest	$I = prt$	I = interest
Compound Interest	$A = p\left(1 + \frac{r}{n}\right)^{nt}$	p = principal
Continuously Compounded Interest	$A = pe^{rt}$	r = annual interest rate
		t = number of years
		A = amount of money after t years
		n = compound periods per year
		$e \approx 2.718$

Exponential Growth and Decay

Periodic	$N_t = N_0(1 + r)^t$	N_t = value at time t or after t time periods
Continuous	$N_t = N_0 e^{rt}$	r = rate of growth
		t = time or number of time periods
		$e \approx 2.718$

Polar Coordinates and Vectors

De Moivre's Theorem

$$[r(\cos\theta + i\sin\theta)]^n = r^n(\cos n\theta + i\sin n\theta)$$

Conversion: Polar to Rectangular Coordinates $x = r\cos\theta$, $y = r\sin\theta$

Conversion: Rectangular to Polar Coordinates $r = \sqrt{x^2 + y^2}$, $\theta = \arctan\frac{y}{x}$, when $x > 0$

$\theta = \pi + \arctan\frac{y}{x}$, when $x < 0$

Product of Complex Numbers in Polar Form $[r_1(\cos\theta_1 + i\sin\theta_1)][r_2(\cos\theta_2 + i\sin\theta_2)] = r_1r_2[\cos(\theta_1 + \theta_2) + i\sin(\theta_1 + \theta_2)]$

Inner Product of Vectors $\mathbf{a} \cdot \mathbf{b} = a_1b_1 + a_2b_2 + a_3b_3$

r = radius, distance from origin

θ = angle measure in standard position

n = exponent

$\mathbf{a} = \langle a_1, a_2 \rangle$ vector in the plane

$\mathbf{a} = \langle a_1, a_2, a_3 \rangle$ vector in space

Matrices

Determinant of a 2 × 2 Matrix $\det\begin{bmatrix} a & b \\ c & d \end{bmatrix} = ad - bc$

Determinant of a 3 × 3 Matrix $\det\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & j \end{bmatrix} = a \cdot \det\begin{bmatrix} e & f \\ h & j \end{bmatrix} - b \cdot \det\begin{bmatrix} d & f \\ g & j \end{bmatrix} + c \cdot \det\begin{bmatrix} d & e \\ g & h \end{bmatrix}$

Inverse of a 2 × 2 Matrix $M^{-1} = \frac{1}{\det M}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$ where $M = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$

Trigonometry

Sum and Difference Identities

α, β, θ = angle measures in standard position

$$\sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \cos\alpha\sin\beta$$

$$\cos(\alpha \pm \beta) = \cos\alpha\cos\beta \mp \sin\alpha\sin\beta$$

$$\tan(\alpha \pm \beta) = \frac{\tan\alpha \pm \tan\beta}{1 \mp \tan\alpha\tan\beta}$$

Double-Angle Identities

$$\sin 2\theta = 2\sin\theta\cos\theta$$

$$\cos 2\theta = \cos^2\theta - \sin^2\theta$$

$$\tan 2\theta = \frac{2\tan\theta}{1 - \tan^2\theta}$$

Half-Angle Identities

$$\sin\frac{\alpha}{2} = \pm\sqrt{\frac{1 - \cos\alpha}{2}}$$

$$\cos\frac{\alpha}{2} = \pm\sqrt{\frac{1 + \cos\alpha}{2}}$$

$$\tan\frac{\alpha}{2} = \pm\sqrt{\frac{1 - \cos\alpha}{1 + \cos\alpha}}, \text{ where } \cos\alpha \neq -1$$

Miscellaneous

Distance, Rate, Time $D = rt$

Direct Variation (y varies directly with x) $y = kx$

Indirect Variation (y varies indirectly with x)

D = distance

r = rate

t = time

k = variation constant

1. Richard has 5 shirts, 6 pairs of jeans, and 3 vests. How many different outfits—each composed of a shirt, a pair of jeans, and a vest—can he make?

A. 6
B. 14
C. 33
D. 90

2. What is the value this function for $x = -3$?

$f(x) = 4x^3 - 5x^2 + 2x - 4$

A. –163
B. –151
C. –73
D. 53

3. Evaluate $\frac{\log_5 25}{\log_5 5}$.

A. 1
B. 2
C. 5
D. 20

4. What is the equation of the circle with center (3,–6) and radius $\frac{15}{8}$?

A. $(x-3)^2 + (y+6)^2 = \frac{225}{64}$
B. $(x-3)^2 + (y+6)^2 = \frac{15}{8}$
C. $(x+3)^2 + (y-6)^2 = \frac{225}{64}$
D. $(x+3)^2 + (y-6)^2 = \frac{15}{8}$

5. A math teacher has 20 students. She randomly selects the names of 3 different students. The first student explains the first homework problem, the second student explains the second problem, and the third student explains the third problem. In how many ways can the teacher assign these 20 students to the 3 problems?

A. $\frac{20!}{3!}$
B. $\frac{20!}{17!}$
C. $\frac{20!}{17!3!}$
D. $\frac{20!}{17! + 3!}$

6. Which matrix is in reduced row-echelon form?

A. $\left[\begin{array}{ccc|c} 1 & -2 & 0 & 3 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & -1 \end{array}\right]$

B. $\left[\begin{array}{ccc|c} 1 & 0 & 0 & -5 \\ 0 & 1 & 0 & 6 \\ 0 & 0 & 1 & 0 \end{array}\right]$

C. $\left[\begin{array}{ccc|c} 1 & 1 & 1 & -17 \\ 0 & 1 & 0 & 6 \\ 0 & 0 & 1 & 1 \end{array}\right]$

D. $\left[\begin{array}{ccc|c} 0 & 1 & 3 & 5 \\ 1 & 0 & 0 & -1 \\ 0 & 0 & 1 & 2 \end{array}\right]$

7. What is the complex conjugate of $7+\sqrt{-8}$?

A. $7+4i\sqrt{2}$

B. $7-4i\sqrt{2}$

C. $7+2i\sqrt{2}$

D. $7-2i\sqrt{2}$

8. How many times does the graph of $f(x)=4x^3-3x$ cross the x-axis?

A. 2

B. 3

C. 4

D. 5

9. What is the solution set to $|2x-4|<6$?

A. $\{x \mid x<1\}$

B. $\{x \mid x<5\}$

C. $\{x \mid -1<x<5\}$

D. $\{x \mid -2<x<10\}$

10. On the first of every month, a new library receives a shipment of 575 books. If the library starts the beginning of the first year with 3,000 books and receives a shipment that month, how many books will it have at the end of 3 years?

A. 42,900
B. 23,700
C. 5,363
D. 4,150

11. Which of the following is equivalent to this expression?

$3(x^2 + 2) - 5(2x^2 + 3x - 4) + 2(-x^2 - 4)$

A. $-5x^2 - 15x + 18$
B. $-5x^2 + 15x - 22$
C. $-9x^2 - 15x + 18$
D. $-9x^2 + 15x - 22$

12. What is the point of intersection in the second quadrant of the graphs of the equations $x^2 + y^2 = 25$ and $9x^2 + 16y^2 = 288$?

A. (–16,9)
B. (–4,–3)
C. (–4,3)
D. (–3,4)

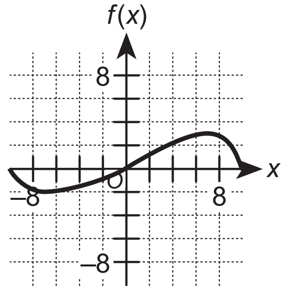
13. Describe the symmetry of the graph of the relation $y = 3|x| - 5$.

A. Symmetric only with respect to the x-axis
B. Symmetric only with respect to the y-axis
C. Symmetric with respect to the x-axis and y-axis, but not with respect to the origin
D. Symmetric with respect to the x-axis, y-axis, and the origin

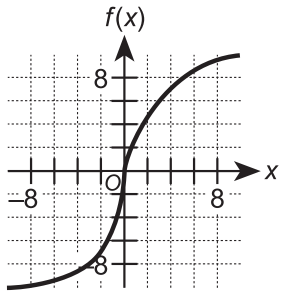
14. Which statement about the graph of the function $f(x) = -7x^4 + 7x^2$ is true?

A. The graph crosses the x-axis at $x = -1$, $x = 0$, and $x = 1$.
B. The graph touches, but does not cross, the x-axis at $x = -1$, $x = 0$, and $x = 1$.
C. The graph crosses the x-axis at $x = -1$ and $x = 1$ and touches, but does not cross, the x-axis at $x = 0$.
D. The graph crosses the x-axis at $x = 0$ and touches, but does not cross, the x-axis at $x = -1$ and $x = 1$.

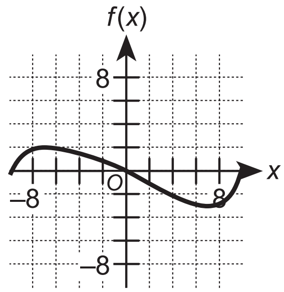
15. Which graph represents the inverse of this function?



A.



C.



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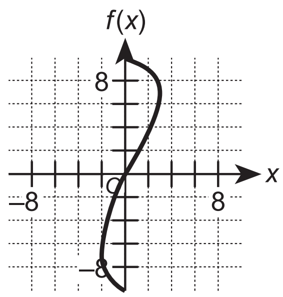
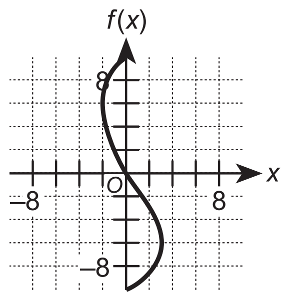


D.



16. Angles α and β lie in Quadrant I. If $\sin(\alpha) = \frac{1}{\sqrt{2}}$ and $\cos(\beta) = \frac{3}{5}$, what is the value of $\sin(\alpha + \beta)$?

A. $\frac{1}{5\sqrt{2}}$

B. $\frac{1 + 2\sqrt{2}}{5\sqrt{2}}$

C. $\frac{7}{5\sqrt{2}}$

D. $\frac{5 + 3\sqrt{2}}{5\sqrt{2}}$

17. What is the complete factorization of $16r^{3n} - 54q^{6a}$, where a, n, r, and q are integers?

A. $2(8r^{3n} - 27^{6a})$

B. $(4r^{2n} + 6q^{a})(4r^{n} - 9q^{5a})$

C. $2(4r^{2n} + 3q^{a})(2r^{n} - 9q^{5a})$

D. $2(2r^{n} - 3q^{2a})(4r^{2n} + 6r^{n}q^{2a} + 9q^{4a})$

18. Evaluate $\sum_{x=1}^{10}(7-2x)$.

A. –8
B. –13
C. –40
D. –80

19. What is the solution set to the inequality $|3x-2|<7$?

A. $\left\{x \middle| -\frac{5}{3}<x<3\right\}$
B. $\left\{x \middle| -3<x<\frac{5}{3}\right\}$
C. $\left\{x \middle| x>3 \text{ or } x<-\frac{5}{3}\right\}$
D. $\left\{x \middle| x>\frac{5}{3} \textit{ or } x<-3\right\}$

20. After rationalizing the denominator and simplifying $\frac{4+\sqrt{6}}{4+\sqrt{2}}=$?

A. $\frac{8-\sqrt{2}}{7}$
B. $\frac{8-2\sqrt{2}-\sqrt{3}+2\sqrt{6}}{7}$
C. $8+2\sqrt{2}-\sqrt{3}+2\sqrt{6}$
D. $\frac{8-2\sqrt{2}-\sqrt{3}+2\sqrt{6}}{7}$

21. In $\triangle ABC$, $m\angle ACB=48°$, $AC=17$ ft, and $CB=10$ ft. To the nearest 0.1 ft, what is AB?

A. 12.7
B. 13.7
C. 19.7
D. 25.1

22. A business owner spent \$500.00 on start-up fees to produce and sell candles. Each candle costs an additional \$3.00 to produce. What is the minimum number of candles that the owner must produce for the average cost per candle to be less than \$3.75?

A. 134
B. 167
C. 375
D. 667

23. Jamal graphs a hyperbola with its center at the origin and a vertical transverse axis of length 24 units. The distance between the center of the hyperbola and its focus is 13 units. What is the equation of the hyperbola?

A. $\frac{x^2}{24^2} - \frac{y^2}{13^2} = 1$

B. $\frac{y^2}{12^2} - \frac{x^2}{13^2} = 1$

C. $\frac{x^2}{12^2} - \frac{y^2}{5^2} = 1$

D. $\frac{y^2}{12^2} - \frac{x^2}{5^2} = 1$

24. What are the solutions to the equation $x^3 - 3x^2 - 50x + 150 = 0$?

A. $-5\sqrt{2}$, 3, $5\sqrt{2}$

B. 3, $-5i\sqrt{2}$, $5i\sqrt{2}$

C. $-2\sqrt{5}$, 3, $2\sqrt{5}$

D. $-5\sqrt{2}$, –3, $5\sqrt{2}$

25. Tuyen walked 2.0 miles due north, 5.0 miles due west, 3.0 miles due south, and 1.0 miles due east. To the nearest tenth of a mile, how far is Tuyen from her starting point?

A. 4.1

B. 7.8

C. 11.0

D. 17.0

26. Which of the following cubic polynomials has 3 and $3 - i$ as zeros?

A. $x^3 - 3x^2 - 9x + 27$

B. $x^3 + 3x^2 - 10x - 30$

C. $x^3 - 9x^2 + 28x - 30$

D. $x^3 + 9x^2 + 28x + 30$

27. What are the minimum and maximum values of the function $f(x,y) = 2x - 3y$ for the region defined by $x \geq -2$, $2 \leq y \leq 5$, and $y \geq x + 1$?

A. Minimum: –7
Maximum: –10

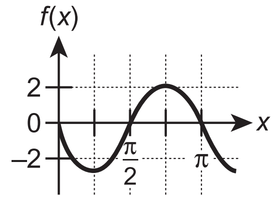
B. Minimum: –7
Maximum: –4

C. Minimum: –19
Maximum: –4

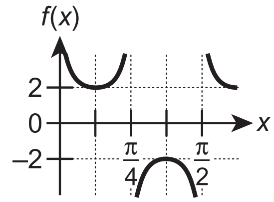
D. Minimum: –19
Maximum: –1

28. Which graph shows a function with a period of $\frac{\pi}{2}$ and an amplitude of 2?

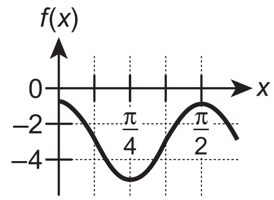
A.



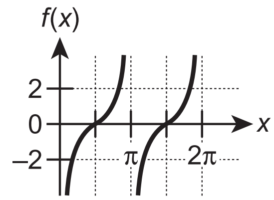
C.



B.



D.



29. The radius of circle O is 15 m. Two radii, $\overline{OA}$ and $\overline{OB}$, form an angle of 80°. To the nearest tenth of a meter, how long is chord $\overline{AB}$?

A. 14.8
B. 15.0
C. 19.3
D. 21.2

30. If $f(x) = \sqrt{x} - 2x$ and $g(x) = \frac{x}{5 - x}$, what is $f(g(x))$?

A. $\sqrt{\frac{x}{5 - x}} - \frac{2x}{5 - x}$

B. $\frac{\sqrt{x} - 2x}{5 - \sqrt{x} + 2x}$

C. $\frac{\sqrt{x} - 2x}{5 - x}$

D. $\frac{x\sqrt{x} - 2x^2}{5 - x}$

31. In a normal distribution, 42% of the data is below 35 and 15% is above 62. What are the approximate values of the mean and the standard deviation of the distribution?

A. The mean is 39.3, and the standard deviation is 21.8.
B. The mean is 28.6, and the standard deviation is 32.1.
C. The mean is 13.7, and the standard deviation is 15.1.
D. The mean is 41.4, and the standard deviation is 32.1.

32. A researcher wants to conduct a survey of hours of Internet use by high school students in a specific state. Which sampling method is most likely the least biased?

A. Select 5 school districts at random, then select 2 schools from each of the districts, then survey all students in grades 9–12 in the selected schools.

B. Select a school district at random, then survey the students in grades 9–12 in all schools of the selected district.

C. Select 2 schools at random from each district of the state. For the survey, select 50 students in grades 9–12 from each of these schools using random sampling.

D. Select 10 schools by systematic sampling. Divide the students of the selected schools into 8 strata according to grade and gender. Select 4 students at random from each stratum.

33. If r is a positive number, which statement about points $A(r,\theta)$ and $B(-r,\theta)$ is true?

A. They are $\frac{r}{2}$ units from the pole and lie in the same quadrant.

B. They are $\frac{r}{2}$ units from the pole and lie in opposite quadrants.

C. They are r units from the pole and lie in the same quadrant.

D. They are r units from the pole and lie in opposite quadrants.

34. Which statement about the function $f(x) = x\cos^{-1}\left(-\frac{3}{2}\right)$ is true?

A. The function is not defined for any x because the absolute value of $-\frac{3}{2}$ is greater than 1.

B. The function is not defined for any x because $-\frac{3}{2}$ is less than 0.

C. The function is defined only for $-\frac{2}{3} \le x \le \frac{2}{3}$.

D. The function is defined because both x and $\cos(x)$ are defined for all real values of x.

35. Evaluate $\sum_{n=1}^{\infty} \frac{1}{2}(-3)^{-n}$.

A. $-\frac{1}{4}$

B. $-\frac{1}{8}$

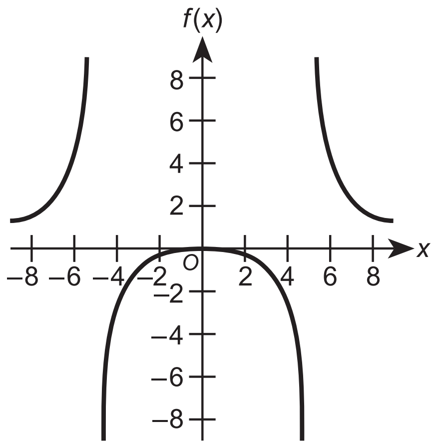
C. $\frac{1}{8}$

D. $\frac{3}{8}$

36. The Gala Events Center has a rectangular parking lot measuring 30 m by 50 m. Only 80% of the lot is usable space. Each parked car requires 6 m^2 of space; each bus requires 30 m^2. The attendant can handle no more than 100 vehicles. It costs $5 to park a car and $15 to park a bus. What is the maximum income for a full lot?

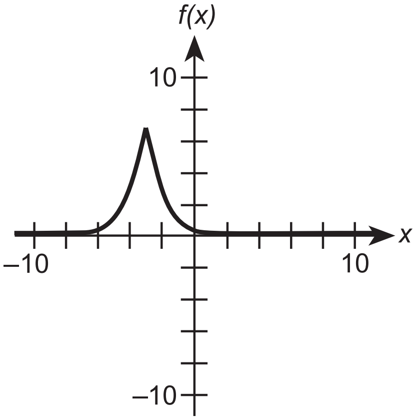
- **A.** $500
- **B.** $750
- **C.** $1,000
- **D.** $1,500

37. Which function is represented by this graph?



- **A.** $f(x) = \frac{x^2}{x^2 + 25}$
- **B.** $f(x) = \frac{x^2}{x^2 - 25}$
- **C.** $f(x) = \frac{5x^2}{x^2 - 1}$
- **D.** $f(x) = \frac{5x^2}{x^2 + 1}$

38. Which statement best describes this graph?



A. The graph of $f(x) = e^{|x|}$ was reflected about the y-axis, vertically translated 7 units up, and shifted to the left by 3 units.

B. The graph of $f(x) = e^{|x|}$ was reflected about the y-axis, vertically translated 7 units up, and shifted to the right by 3 units.

C. The graph of $f(x) = e^{-|x|}$ was vertically stretched with a factor of 7 and shifted to the left by 3 units.

D. The graph of $f(x) = e^{-|x|}$ was vertically stretched with a factor of 7 and shifted to the right by 3 units.

39. Which of the following is a solution to $\sin\left(x\sqrt{2}\right) = 1$?

A. $-\frac{7\pi}{2\sqrt{2}}$

B. $-\frac{\pi}{2\sqrt{2}}$

C. $\frac{\pi}{2}$

D. $\frac{11\pi}{2}$

40. The first term of an arithmetic sequence is –15, and the constant difference is d_1. The first term of another arithmetic sequence is 75, and its constant difference is d_2. If the 10th terms of both sequences are the same, what must be true about d_1 and d_2?

A. $d_1 - d_2 = 10$

B. $d_1 - d_2 = 9$

C. $d_1 + d_2 = 10$

D. $d_1 + d_2 = 9$

41. What are the solutions to this matrix equation?

$$\begin{bmatrix} 25 & -8 \\ 4x & 0 \end{bmatrix} + \begin{bmatrix} 5 & 1 \\ x & 3 \end{bmatrix} \begin{bmatrix} -4 & 1 \\ 2 & -3 \end{bmatrix} = \begin{bmatrix} 7 & -6 \\ 6 & x^2 \end{bmatrix}$$

A. –9, 3

B. $\frac{-1 \pm \sqrt{37}}{2}$

C. $\frac{5 \pm i\sqrt{11}}{2}$

D. $\frac{1 \pm i\sqrt{35}}{2}$

42. Four teams participate in a math competition. The number of 1st-, 2nd-, 3rd-, and 4th-place finishes in each round determines the final score. This matrix shows the results of all 10 rounds of this competition.

	1st	2nd	3rd	4th
Team 1	3	4	1	2
Team 2	2	3	3	2
Team 3	4	1	1	4
Team 4	1	2	5	2

Teams earn 4 points for each 1st-place finish, 3 points for each 2nd-place finish, 2 points for each 3rd-place finish, and 1 point for each 4th-place finish. Which teams tie for 2nd place in the final score?

A. 1 and 2

B. 1 and 4

C. 2 and 3

D. 3 and 4

43. What is the value of x in this system of equations?

$$4x - y + z = 2$$
$$x - 2y - 3z = 3$$
$$-5y - 4z = -14$$

A. –9

B. –4

C. 0.45

D. 3

44. The equal sides of an isosceles triangle are each 12 inches long. The measure of each of the equal angles is 56°. To the nearest hundredth of a square inch, what is the area of the isosceles triangle?

A. 26.97
B. 59.69
C. 66.75
D. 133.50

45. If A, B, and C are the 3 angles of a triangle, which expression is equivalent to $\cot(B) + \cot(C)$?

A. $-\cos(A)\sec(B)\sec(C)$
B. $-\cos(A)\csc(B)\csc(C)$
C. $\sin(A)\sec(B)\sec(C)$
D. $\sin(A)\csc(B)\csc(C)$

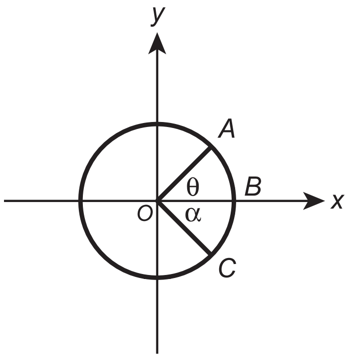
46. An alternating voltage generator source (v) produces a sinusoidal waveform with a peak-to-peak value of 10 volts and a frequency of $\frac{3}{\pi}$ hertz. If a direct voltage source of x volts is added to the alternating voltage generator, the corresponding voltage value for all values of time (t) increases by x volts. What is the equation of the alternating voltage generator source if a direct voltage source of 8 volts is added to it?

A. $v(t) = 5\sin\left(\frac{3t}{2}\right) - 8$
B. $v(t) = 5\sin(6t) + 8$
C. $v(t) = 10\sin\left(\frac{t}{3}\right) - 8$
D. $v(t) = 10\sin(6t + 8)$

47. The number of *Wolffia* plants (N) in an experimental population after t days can be calculated using the equation $N = 2e^{0.56t}$. Approximately how long will it take for the number of *Wolffia* plants to reach 4 times the initial population?

A. 1 day, 2 hours
B. 2 days, 12 hours
C. 3 days, 12 hours
D. 3 days, 18 hours

48. In this figure, points A, B, and C are on the unit circle; $m\angle AOB = \theta$; and $m\angle BOC = \alpha$. What is the distance, in coordinate units, from A to C?



A. $\sqrt{(\cos\theta + \cos\alpha)^2 + (\sin\theta + \sin\alpha)^2}$

B. $\sqrt{(\cos\theta - \cos\alpha)^2 - (\sin\theta + \sin\alpha)^2}$

C. $\sqrt{(\cos\theta - \cos\alpha)^2 + (\sin\theta + \sin\alpha)^2}$

D. $\sqrt{(\cos\theta + \cos\alpha)^2 + (\sin\theta - \sin\alpha)^2}$

49. Two vectors, $\mathbf{a} = 3\mathbf{i} + 5\mathbf{j} - 2\mathbf{k}$ and $\mathbf{b} = 2\mathbf{i} - 2\mathbf{j} - 2\mathbf{k}$, are given. What is the cosine of the angle between the vectors $\mathbf{a} + \mathbf{b}$ and $\mathbf{b}$?

A. 0
B. 0.490
C. 0.872
D. 1

50. Which parametric equations define the line through (3,–5) and perpendicular to the line whose equation is $x + 12y = 60$?

A. $x = t - 3$
$y = 12t + 5$

B. $x = t + 3$
$y = -12t - 5$

C. $x = t + 3$
$y = 12t - 5$

D. $x = 12t + 3$
$y = t - 5$

International Subject Test—
Math 2 Practice Test

Answer Key

The following table contains the question number and the correct answer (Key) for each question in this pdf file.

1	D
2	A
3	B
4	A
5	B
6	B
7	D
8	B
9	C
10	B
11	C
12	C
13	B
14	C
15	B
16	C
17	D
18	C
19	A
20	B
21	A
22	D
23	D
24	A
25	A

26	C
27	C
28	B
29	C
30	A
31	A
32	C
33	D
34	A
35	B
36	B
37	B
38	C
39	A
40	A
41	D
42	C
43	D
44	C
45	D
46	B
47	B
48	C
49	B
50	C