Name: Date:
Teacher: Class/Period:

1) 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

2) In ΔABC, $m\angle ACB = 48°$, $AC = 17$ ft, and $CB = 10$ ft. To the nearest tenth of a foot, what is AB ?

A. 12.7

B. 13.7

C. 19.7

D. 25.1

3) Jennifer and Robbie stand 50 ft apart on opposite sides of a statue. The angle of elevation from Jennifer's feet to the top of the statue is 46°, while the angle of elevation from Robbie's feet to the top of the statue is 52°. How tall, to the nearest tenth of a foot, is the statue?

(Note: Assume the statue and both people stand on level ground.)

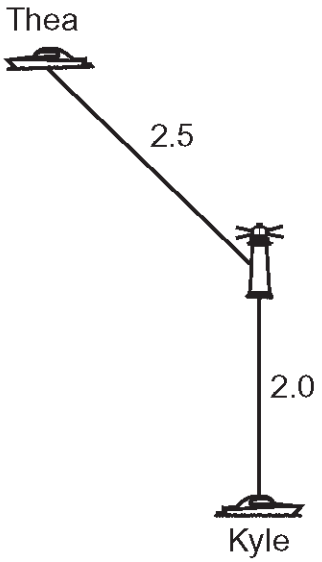
A. 22.4

B. 25.9

C. 26.4

D. 28.6

4) From Kyle's boat, a well-known lighthouse is 2.0 miles due north. From Thea's boat, the same lighthouse is 2.5 miles at a heading 45 degrees east of south. To the nearest tenth of a mile, how far apart are the two boats?



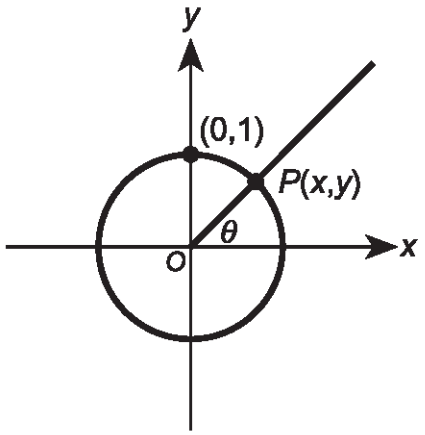
A. 3.2

B. 4.2

C. 4.5

D. 7.1

5) In this unit circle where θ is the angle formed by the x-axis and $\overrightarrow{OP}$, what is another way to write the coordinates of P ?



A. (cos θ, sin θ)

B. (sin θ, cos θ)

C. (cot θ, tan θ)

D. (tan θ, cot θ)

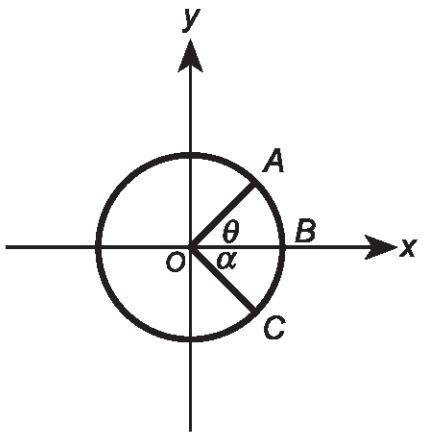
6) In this figure,

Points A, B, and C are on the unit circle.

$m\angle AOB = \theta$

$m\angle BOC = \alpha$

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

7) An angle, A, in standard position on the unit circle, has its terminal side in Quadrant III. If $\tan A = \frac{4}{3}$, what is $\sin A$?

A. $-\frac{3}{5}$

B. $-\frac{4}{5}$

C. $\frac{3}{5}$

D. $\frac{4}{5}$

8) If $\sin \alpha = \frac{\sqrt{3}}{2}$ and $\cos \alpha = \frac{1}{2}$, what is $\cos 2\alpha$?

A. 1

B. $-\frac{1}{2}$

C. $-\frac{\sqrt{3}}{2}$

D. $\sqrt{3}$

9) A local sports dome is fashioned in the shape of a hemisphere. A 12-m tall supporting post, reaching from the ground to the skin of the hemisphere, is set 35 m from the dome's center point, and a rope runs from the top of the post to the nearest point where the hemisphere touches the ground. To the nearest 0.001, what is the cosine of the angle the rope makes with the floor of the dome?

A. 0.164

B. 0.167

C. 0.324

D. 0.946

10) Which is the radian equivalent to three and one-quarter revolutions clockwise?

A. $-\frac{13\pi}{4}$

B. $-\frac{13\pi}{2}$

C. $\frac{13\pi}{4}$

D. $\frac{13\pi}{2}$

11) Where do the minimum values of $y = \sin x$ occur on $[-2\pi, 2\pi]$?

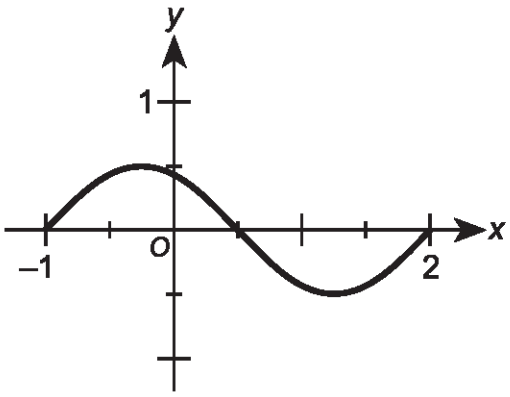
A. $-\frac{\pi}{2}$ and $\frac{3\pi}{2}$

B. $-\frac{3\pi}{2}$ and $\frac{\pi}{2}$

C. $-\pi$ and π

D. -2π and 2π

12) Which best describes the range of this graph of the relation $y = f(x)$?



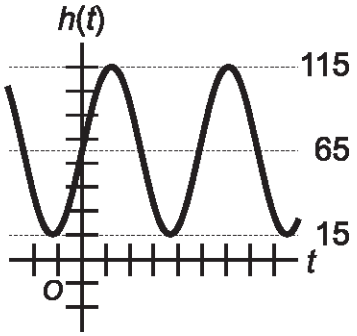
A. $-1 \le x \le 2$

B. $-\frac{1}{2} \le x \le \frac{1}{2}$

C. $-1 \le y \le 2$

D. $-\frac{1}{2} \le y \le \frac{1}{2}$

13) This graph shows the height above ground, $h(t)$, of a rider on a Ferris wheel as a function of time, t. What is the amplitude of the sine function that models the rider's height above ground?



A. 50

B. 65

C. 100

D. 115

14) What are the amplitude and period of $y = 2 \cos x$?

A. Amplitude is −2; period is 2

B. Amplitude is 2; period is 2π

C. Amplitude is 2; period is 4π

D. Amplitude is 2; period is 2

15) What is the amplitude of the function $f(x) = 2 \sin(6x + 5) - 7$, where x is measured in radians?

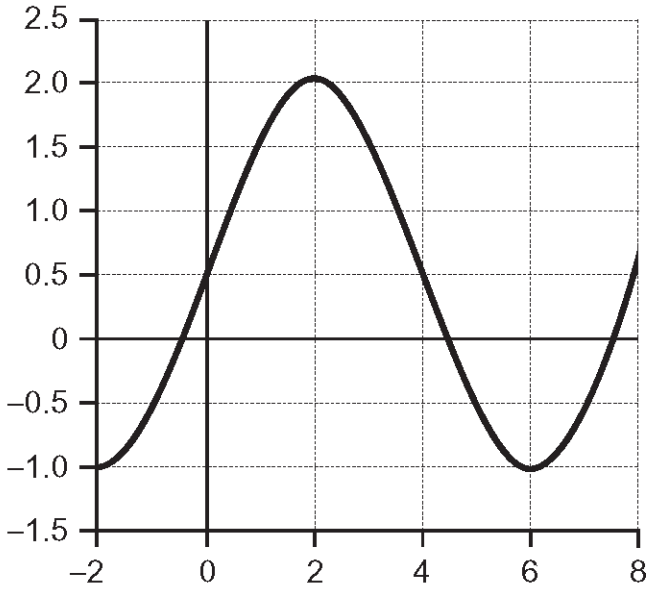
A. 1

B. 2

C. 6

D. –7

16) The illustration shows part of the graph of $y = \frac{3}{2} \sin\left(\frac{4x}{5}\right) + \frac{1}{2}$ in the xy-plane. What is the period of the function?



A. 8

B. $\frac{5}{4}\pi + \frac{1}{2}$

C. $\frac{5}{2}\pi$

D. 3π

17) What is the equation for the asymptote of $y = \tan(\theta - \frac{\pi}{4}) + \frac{\pi}{2}$ on the interval $[0, \pi]$?

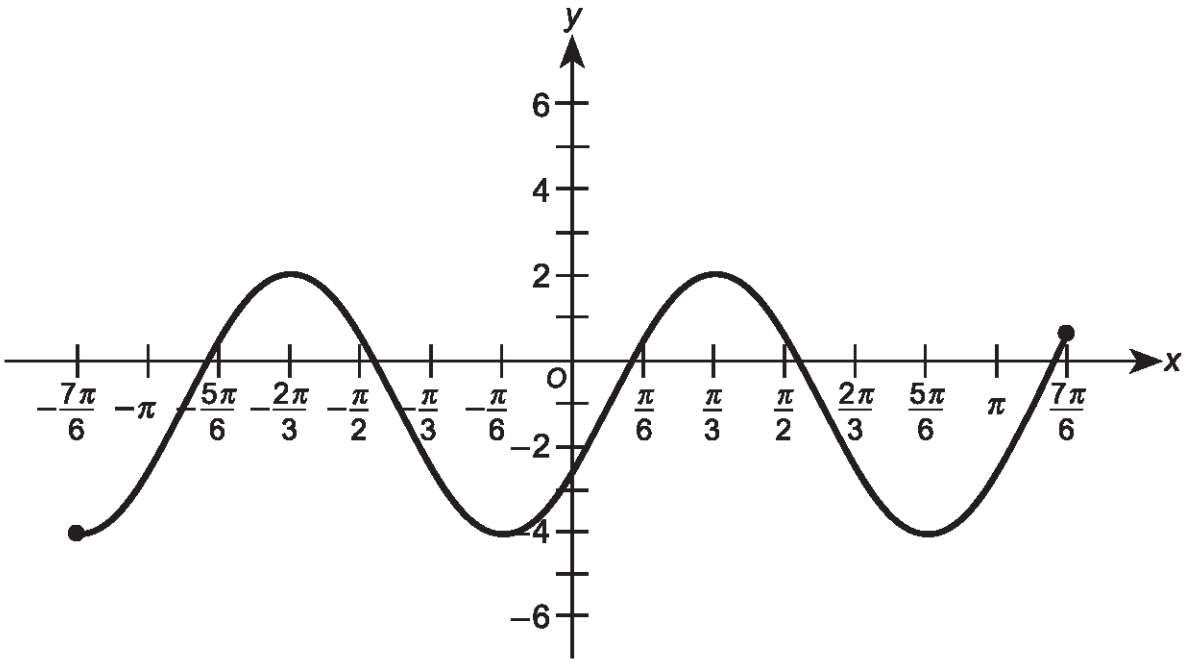
A. $x = \frac{\pi}{4}$

B. $x = \frac{\pi}{2}$

C. $x = \frac{3\pi}{4}$

D. $x = \pi$

18) Alyssa created the function shown by restricting the domain of a transformed sine function.



A. What was the period of the original function? Show your work, and explain the approach you used to find your answer.

B. What is the amplitude of the graph of the function? Show your work, and explain the approach you used to find your answer.

C. What is the domain of the graphed function? Explain how you determined your answer.

D. What is the range of the graphed function? Explain how you determined your answer.

Please use the space below to write your response(s) to the writing assignment provided by your teacher. If there are multiple tasks to the question, please clearly label the number or letter of each task in the column to the left of your answers. If you need additional pages for your response, your teacher can provide them.

Please write the name of the writing assignment here: _____

Task

QualityCore™

Reference Sheet for the QualityCore™ **Algebra II End-of-Course Assessment**

Equations of a Line

Standard Form	$Ax + By = C$	A, B, and C are constants with A and B not both equal to zero.
Slope-Intercept Form	$y = mx + b$	(x_1,y_1) is a point. m = slope b = y-intercept
Point-Slope Form	$y - y_1 = m(x - x_1)$	

Quadratics

Standard Form of a Quadratic Equation	$ax^2 + bx + c = 0$	a, b, and c are constants, where $a \neq 0$.
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	

Conic Sections

Circle	$(x - h)^2 + (y - k)^2 = r^2$	center (h,k) r = radius	
Parabola	$y = a(x - h)^2 + k$	axis of symmetry $x = h$ directrix $y = k - \frac{1}{4a}$	vertex (h,k) focus $\left(h, k + \frac{1}{4a}\right)$
Parabola	$x = a(y - k)^2 + h$	axis of symmetry $y = k$ directrix $x = h - \frac{1}{4a}$	vertex (h,k) focus $\left(h + \frac{1}{4a}, k\right)$
Ellipse	$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$	foci $(h \pm c, k)$ where $c^2 = a^2 - b^2$, center (h,k)	
Ellipse	$\frac{(y-k)^2}{a^2} + \frac{(x-h)^2}{b^2} = 1$	foci $(h, k \pm c)$ where $c^2 = a^2 - b^2$, center (h,k)	
Hyperbola	$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$	foci $(h \pm c, k)$ where $c^2 = a^2 + b^2$, center (h,k)	
Hyperbola	$\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$	foci $(h, k \pm c)$ where $c^2 = a^2 + b^2$, center (h,k)	

Lines and Points

Slope	$m = \frac{y_2 - y_1}{x_2 - x_1}$	(x_1,y_1) and (x_2,y_2) are 2 points. m = slope M = midpoint d = distance
Midpoint	$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$	
Distance	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	

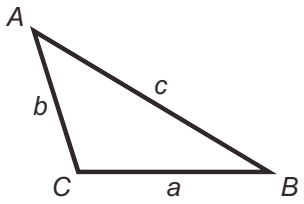
continued

Miscellaneous

Distance, Rate, Time	$D = rt$	D = distance r = rate t = time I = interest p = principal A = amount of money after t years n = number of times interest is compounded annually
Simple Interest	$I = prt$	
Compound Interest	$A = p\left(1 + \frac{r}{n}\right)^{nt}$	
Pythagorean Theorem	$a^2 + b^2 = c^2$	a and b = legs of right triangle c = hypotenuse

Laws of Sines and Cosines

Law of Sines	$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$
Law of Cosines	$a^2 = b^2 + c^2 - 2bc \cos A$



Sequences, Series, and Counting

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

Circumference, Area, and Volume

Triangle	$A = \frac{1}{2}bh$	A = area b = base h = height r = radius C = circumference d = diameter V = volume B = area of base $\pi \approx 3.14$
Parallelogram	$A = bh$	
Trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$	
Circle	$A = \pi r^2$ $C = \pi d$	
General Prism	$V = Bh$	
Right Circular Cylinder	$V = \pi r^2 h$	
Pyramid	$V = \frac{1}{3}Bh$	
Right Circular Cone	$V = \frac{1}{3}\pi r^2 h$	
Sphere	$V = \frac{4}{3}\pi r^3$	

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Answer Key

1) C
2) A
3) D
4) B
5) A
6) C
7) B
8) B
9) A
10) B
11) A
12) D
13) A
14) B
15) B
16) C
17) C

Scoring Criteria:

18)

A 4-point response may include, but is not limited to, the following points:

A. **Correct period:** π

Appropriate work needed to find the answer:
$\frac{\pi}{3}-\left(-\frac{2\pi}{3}\right)=\frac{3\pi}{3}$

Explanation of the approach used to find the answer: The graph has successive maxima at $x=-\frac{2\pi}{3}$ and $x=\frac{\pi}{3}$. Therefore, the graph goes through 1 period in going from $x=-\frac{2\pi}{3}$ to $x=\frac{\pi}{3}$.

B. **Correct amplitude:** 3

Appropriate work needed to find the answer:
$\frac{1}{2}\left(2-\left(-4\right)\right)=\frac{1}{2}(6)$

Explanation of the approach used to find the answer: The amplitude is $\frac{1}{2}$ the distance from the maximum (2) to the minimum (−4).

C. **Correct domain:** $\left[-\frac{7\pi}{6},\frac{7\pi}{6}\right]$

Explanation of how the answer was determined: The graph starts at $x=-\frac{7\pi}{6}$ and ends at $x=\frac{7\pi}{6}$. Since there are closed dots at these points, I include the endpoints of the domain.

D. **Correct range:** $\left[-4,2\right]$

Explanation of how the answer was determined: The minimum *y*-value on the graph is 4, and the maximum value on the graph is 2. Since there are closed dots at these points, I include the endpoints of the range.

Rubric:

4 **A response at this level provides evidence of thorough knowledge and understanding of the subject matter.**

- The response addresses all parts of the question or problem correctly.
- The response demonstrates efficient and accurate use of appropriate procedures.
- The explanation of strategies used in the response shows evidence of a good understanding of mathematical concepts and principles, and it does not contain any misconceptions.
- The explanation in the response is clear and coherent.

3 **A response at this level provides evidence of competent knowledge and understanding of the subject matter.**

- The response addresses most parts of the question or problem correctly.
- The response includes some minor errors but generally uses appropriate procedures accurately.
- The explanation of strategies used in the response shows some evidence of a good understanding of mathematical concepts and principles, and it contains few, if any, misconceptions.
- The explanation in the response is mostly clear and coherent.

2 **A response at this level provides evidence of a basic knowledge and understanding of the subject matter.**

- The response addresses some parts of the question or problem correctly.
- The response includes a number of errors but demonstrates some use of appropriate procedures.
- The explanation of strategies used in the response shows a little evidence of understanding of mathematical concepts and principles, but it may contain some evidence of misconceptions.
- The explanation in the response is partially clear, but some parts may be difficult to understand.

1 **A response at this level provides evidence of minimal knowledge and understanding of the subject matter.**

- The response addresses a few parts of the problem correctly, but the response is mostly incorrect.
- The response includes inappropriate procedures or simple manipulations that show little or no understanding of correct procedures.
- The explanation of strategies used in the response shows little or no evidence of understanding of mathematical concepts and principles, and it may contain evidence of significant misconceptions.
- Many parts of the explanation are difficult to understand.

0 **A response at this level is not scorable.** The response is off-topic, blank, hostile, or otherwise not scorable.