

Name _____

Algebra 2 CC - Unit 11

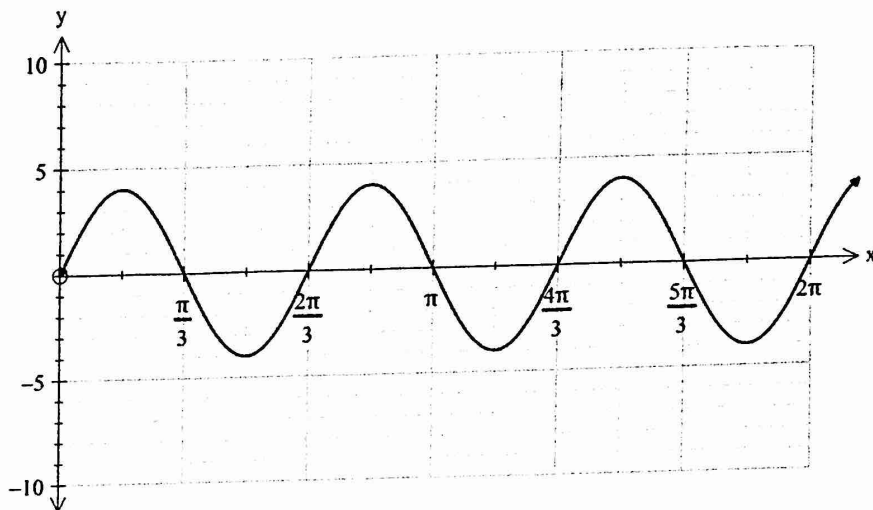
1. Write the equation for the sinusoidal function below:

Amplitude: 4
 Midline: 0
 Period: $2\pi/3$
 Frequency: 3
 Equation: $y = 4\sin(3x)$

$$Bp = 2\pi$$

$$B \frac{2\pi}{3} = 2\pi$$

$$B = 3$$



2. Write the equation for the sinusoidal function below:

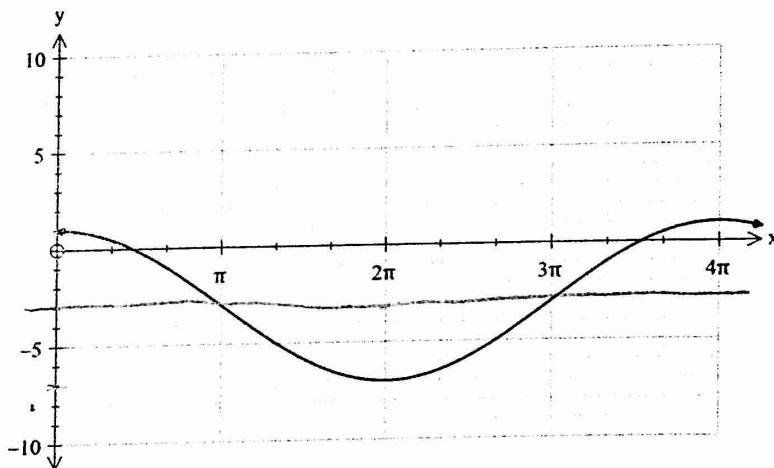
Amplitude: 4
 Midline: -3
 Period: 4π
 Frequency: $1/2$
 Equation: $y = 4\cos(\frac{1}{2}x) - 3$

$$\frac{1 + -7}{2} = \frac{-6}{2} = -3$$

$$Bp = 2\pi$$

$$B \frac{4\pi}{4\pi} = \frac{2\pi}{4\pi}$$

$$B = \frac{1}{2}$$



3. Write the equation for the sinusoidal function below:

Amplitude: 3
 Midline: 5
 Period: 3
 Frequency: $2\pi/3$
 Equation: $y = -3\cos(2\pi/3 x) + 5$

midline

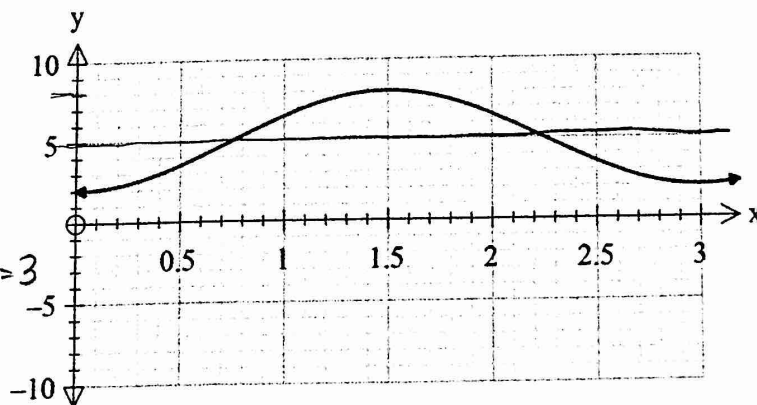
$$\frac{B+2}{2} = 5$$

$$\text{Amp} = \frac{8-2}{2} = \frac{6}{2} = 3$$

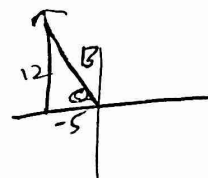
$$Bp = 2\pi$$

$$B \frac{3}{3} = \frac{2\pi}{3}$$

$$B = \frac{2\pi}{3}$$



4. Find the value of $\sin \theta$ if $\cos \theta = -\frac{5}{13}$ and θ terminates in quadrant II.



$$\sin \theta = \frac{12}{13}$$

5. The terminal side of angle θ in standard position intersects the unit circle with

equation $x^2 + y^2 = 1$ at the point $\left(\frac{8}{17}, -\frac{15}{17}\right)$. The value of $\cos \theta$ is

- (1) $\frac{8}{17}$ (2) $-\frac{8}{17}$ (3) $\frac{15}{17}$ (4) $-\frac{15}{17}$

6. If θ is an angle in standard position whose terminal side intersects the unit circle at the point $\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$, then a possible value for θ is

(1) -150°

(2) 135°

(3) 120°

(4) -210°

7. Which of the following angles does not have a reference angle of 20° ?

(1) -20°

(2) 160°

(3) 250°

(4) 380°

8. Expressed as a function of a positive, acute angle, $\cos(240^\circ) = ?$

(1) $\cos(30^\circ)$

(2) $\cos(120^\circ)$

(3) $-\cos(30^\circ)$

(4) $-\cos(60^\circ)$

9. Which of the following angles is not coterminal with the angle $\theta = 40^\circ$?

(1) 400°

(2) -320°

(3) 760°

(4) 40°

11. Which of the following represents the range of the function $y = -4\sin(x) + 6$?

(1) $(2, 10)$

(2) $[2, 10]$

(3) $[-10, 2]$

(4) $(-10, 2)$

11. 2

12. A sinusoidal equation of the form $y = A\sin(x) + C$ has a maximum y -value of 14 and a minimum y -value of -6 . Which of the following is the value of C ?

$$\frac{14 + (-6)}{2} = \frac{8}{2} = 4$$

$$\begin{aligned} b + 4 &= 10 \\ b - 4 &= 2 \end{aligned}$$

(1) 10

(2) -8

(3) -2

(4)

13. Which of the following lines would *not* intersect $y = 6\cos(x) + 2$?

8

4

13. _____

(1) $y = -4$

(2) $y = -2$

(3) $y = 8$

(4) $y = 10$

10. An arc of length 25 inches is subtended by an angle of 1.5 radians. What, to the nearest tenth of an inch, is the radius of the circle?

$$S = \theta \cdot r$$

$$\frac{25}{1.5} = \frac{1.5}{1.5} \cdot r \quad r = 16.6666$$

$r = 16.7$

11. Convert each of the following degree measures to its equivalent radian measure. Leave in reduced form in terms of π .

a. $144^\circ \cdot \frac{\pi}{180}$

$\frac{4\pi}{5}$

b. $330^\circ \cdot \frac{\pi}{180}$

$\frac{11\pi}{6}$

c. $270^\circ \cdot \frac{\pi}{180}$

$\frac{3\pi}{2}$

12. Convert each of the following radian measures to its equivalent degree measure. Give answers to the nearest degree.

a. $\frac{7\pi}{8} \cdot \frac{180}{\pi}$

b. $2.46 \cdot \frac{180}{\pi}$

c. $\frac{7\pi}{6} \cdot \frac{180}{\pi} = 210^\circ$

157.5°

158°

$140.947 = 141.0$

13. As θ increases from $\frac{\pi}{2}$ to $\frac{3\pi}{2}$, the value of $\cos \theta$

(1) decreases only

(2) increases only

(3) decreases, then increases

(4) increases, then decreases



14. Some years ago an oil tanker called Sea Empress ran aground in a bay called Milford Haven in the west of Wales because the captain misread the tide tables. Suppose the depth of the water in Milford Haven varies with the tide according to the equation $d = 2 \sin\left(\frac{\pi t}{6}\right) + 7$ where d is the depth measured in meters and t is the number of hours since midnight

a. What is the depth of the water at high tide? $7 + 2 = 9$

b. What is the depth of the water at low tide? $7 - 2 = 5$

c. At what time does high tide occur? 3 am

d. How many hours are there between the times when the water is at its deepest? 12 hours

e. At what time does low tide occur? 9 am

