

True or False.

1.  $y = -2 + 3 \sin\left(\frac{\pi}{2}x + \frac{\pi}{2}\right)$

- a. The above graph reflects across the x-axis. False
- b. The above graph will have a phase shift to the right. False
- c. The above graph will have a positive vertical shift. False

2.  $y = 5 \cos(-2\theta) - 3$        $y = 5 \cos(2\theta) - 3$

- a. The above graph reflects across the x-axis. False
- b. The above graph will have a phase shift to the right. False
- c. The above graph will have a positive vertical shift. False

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Provide the requested information for each of the following.

3.  $y = -2 + 3 \sin\left(\frac{\pi}{2}x + \frac{\pi}{2}\right)$

- a. Period: 4
- b. Domain:  $[-1, 3]$
- c. Phase Shift: -1
- d. Range:  $[-5, 1]$

$y = 3 \sin\left(\frac{\pi}{2}x + \frac{\pi}{2}\right) - 2$

a.)  $\frac{2\pi}{b} = \frac{2\pi}{\pi/2} = 2\pi \cdot \frac{2}{\pi} = 4$

b.)  $\frac{\pi}{2}x + \frac{\pi}{2} = 0$

$\frac{\pi}{2}x = -\frac{\pi}{2}$

$x = -1$

c.)  $\curvearrowright$

$\frac{\pi}{2}x + \frac{\pi}{2} = 2\pi$

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

$x = 3$

d.)

4.  $y = 5 \cos(-2\theta) - 3$

- a. Period:  $180^\circ$
- b. Domain:  $[0, 180^\circ]$
- c. Phase Shift: NA
- d. Range:  $[-8, 2]$

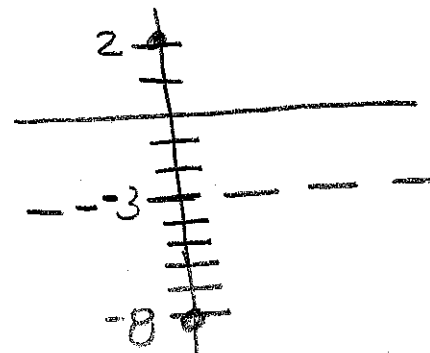
$y = 5 \cos(2\theta) - 3$

a.)  $\frac{360}{b} = \frac{360}{2} = 180^\circ$

d.)

b.)  $2\theta = 0$        $2\theta = 360$   
 $\theta = 0$            $\theta = 180^\circ$

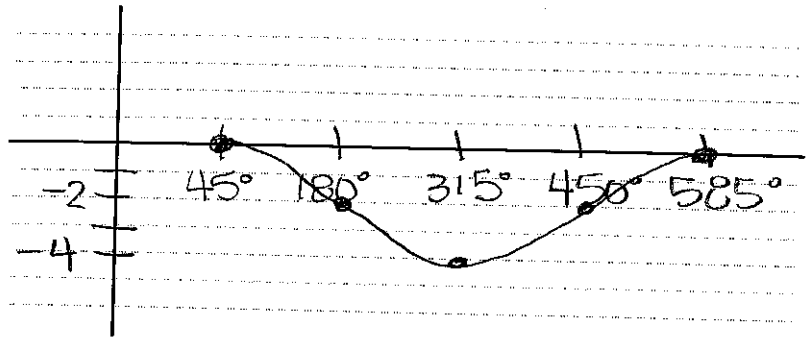
c.)  $\curvearrowright$



5. Graph one period.

$$y = 2 \cos\left(\frac{2}{3}\theta - 30^\circ\right) - 2$$

$$\begin{aligned} \frac{2}{3}\theta - 30 &= 0 & \frac{2}{3}\theta - 30 &= 360 \\ \frac{2}{3}\theta &= 30 & \frac{2}{3}\theta &= 390 \\ \theta &= 45 & \theta &= 585 \end{aligned}$$



a. What is the range?  $[-4, 0]$

b. Using your answer to part a, how could you find the vertical shift?

Find ave =  $\frac{-4 + 0}{2} = -\frac{4}{2} = -2$

c. What is the domain?  $[45^\circ, 585^\circ]$

d. Using your answer to part c, how could you find the period?

$$585 - 45 = 540^\circ$$

e. What is the maximum value?  $0$  What is the minimum value?  $-4$  What is the horizontal axis?  $y = -2$

f. Using your answer to part e, how could you find the amplitude?

Using Max + Min:

$$\frac{\text{Max} - \text{Min}}{2} = \frac{0 - (-4)}{2} = \frac{4}{2} = 2$$

Using Max + horizontal: big # - small #

$$0 - (-2) = 2$$

Using Min + Horizontal: big # - small #

$$-2 - (-4) = 2$$

Provide the requested information for each of the following.

6. If the range of a sine function is  $[12, 56]$ , what is the vertical shift?

$$\frac{12 + 56}{2} = \frac{68}{2} = 34$$

7. If the range of a cosine function is  $[-14, 6]$ , what is the vertical shift?

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

8. If the domain of a cosine function is  $\left[\frac{\pi}{2}, \frac{9\pi}{4}\right]$ , what is the period?

$$\frac{9\pi}{4} - \frac{\pi}{2} = \frac{9\pi}{4} - \frac{2\pi}{4} = \frac{7\pi}{4}$$

9. If the domain of a sine function is  $[\pi, 8\pi]$ , what is the period?

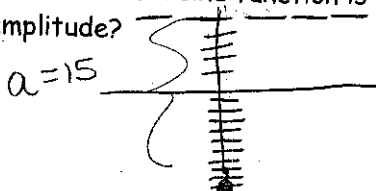
$$8\pi - \pi = 7\pi$$

10. If the horizontal axis of a cosine function is at  $y = -4$  and the maximum value is at 2, then what is the amplitude?



$$2 - (-4) = 6$$

11. If the horizontal axis of a sine function is at  $y = 5$  and the minimum value of the function is at 10, then what is the amplitude?



$$5 - 10 = 15$$