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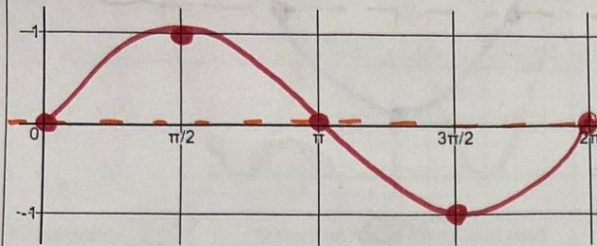
**KEY**

Date: \_\_\_\_\_

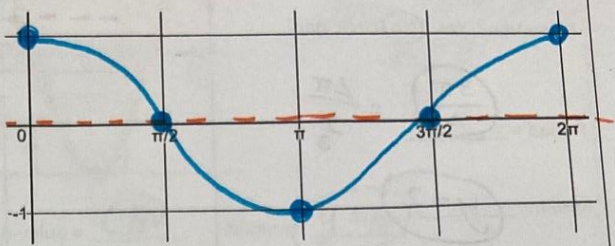
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**UNIT Review 4.3 - Graphing/Applying Sin and Cos Functions - PreCalc. --- Mr. Barsotti**

1.) Graph one cycle of  $y = \sin \theta$



2.) Graph one cycle of  $y = \cos \theta$



Find all the unknowns. Then set the x and y axis up for each graph and label accurately with simplified units. Then **plot at least one cycle** of the function. Write the x-axis labels below the coordinate grids and y-axis labels to the left.

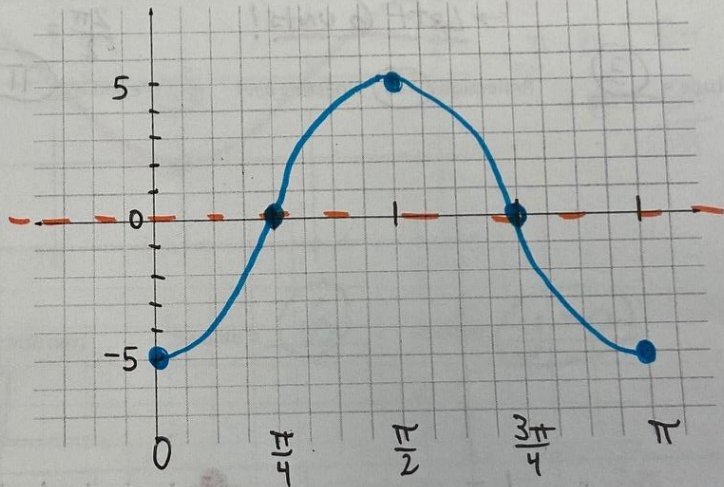
3.)  $y = -5 \cos 2\theta$

Amplitude = 5

Reflection?  Yes  No (circle one)

Period =  $\pi$  =  $\frac{2\pi}{2}$

Midline:  $y = 0$



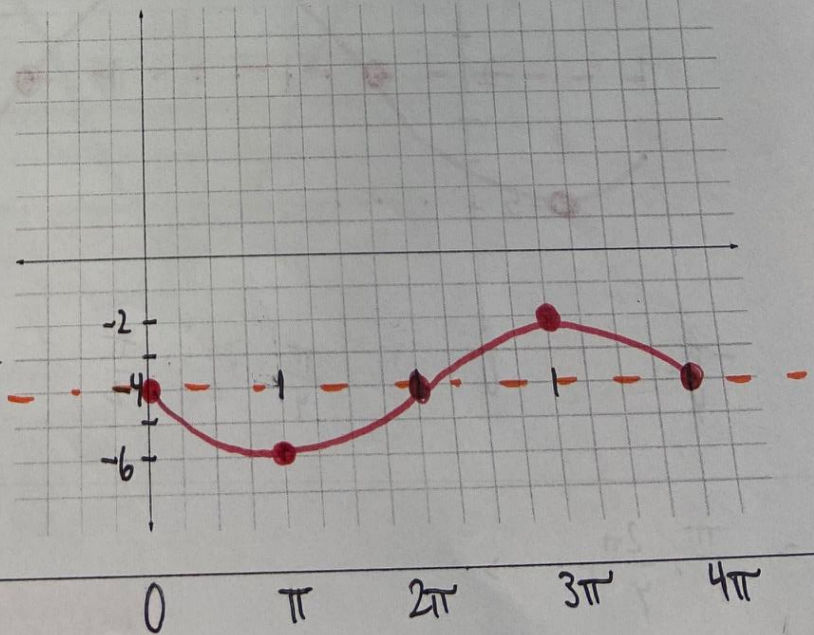
4.)  $y = -2 \sin \frac{\theta}{2} - 4$

Amplitude = 2

Reflection?  Yes  No (circle one)

Period =  $4\pi$  =  $\frac{2\pi}{1/2}$

Midline:  $y = -4$



5.)  $y = 4 \cos \frac{4\theta}{3} + 2$

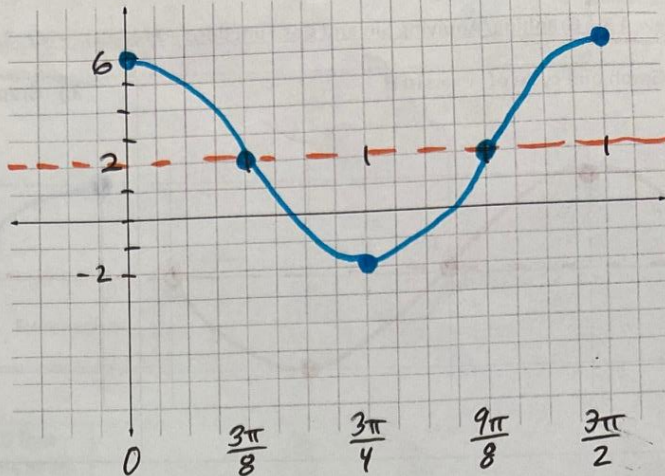
Amplitude = (4)

Reflection? Yes / (No) (circle one)

Period =  $\frac{3\pi}{2} = \frac{2\pi}{\frac{4}{3}}$

Midline: (y=2)

$\frac{3\pi}{2} \cdot \frac{1}{4} = \frac{3\pi}{8}, \dots$



6.)  $y = -3 \sin 2\left(\theta + \frac{3\pi}{8}\right) - 2$  \*\*\* PLOT GRAPH USING THE ENTIRE GRID!!! \*\*\*

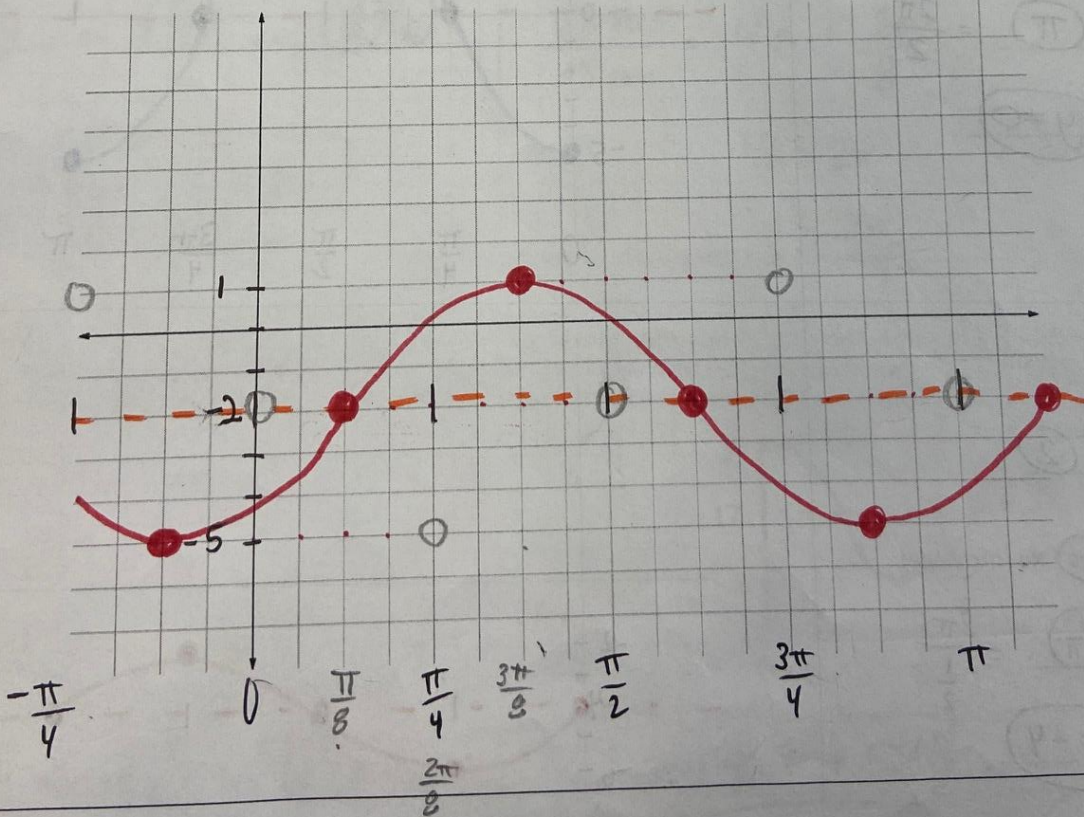
↳ Left 6 units!

Amplitude = (3)

Reflection? (Yes) No (circle one)

Period =  $\frac{2\pi}{2} =$  ( $\pi$ )

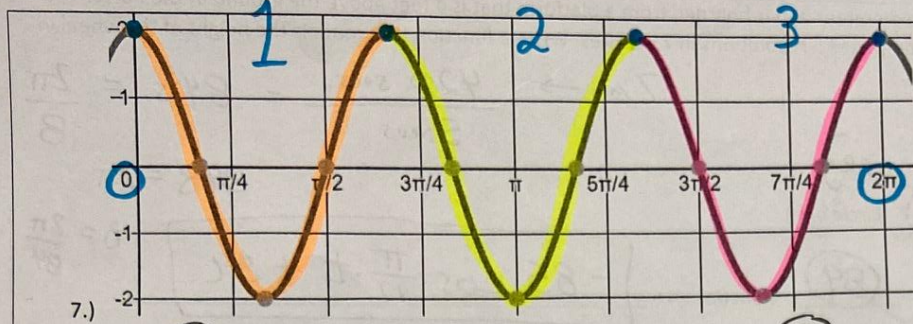
Midline: (y=-2)



$\pi \cdot \frac{1}{4} = \frac{\pi}{4}, \frac{2\pi}{4}, \dots \rightarrow$

Given a Graph, Write the Function:

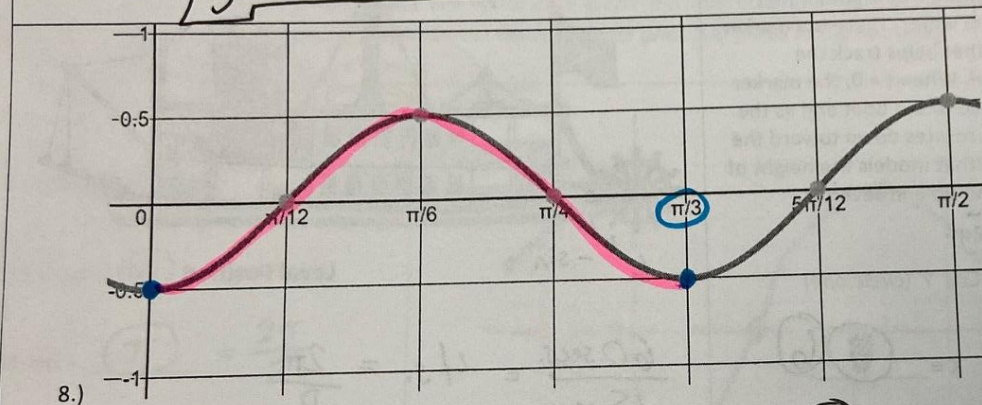
Given these graphs, fill in all the blanks and then write the correct function, starting with "y = ".



3 cycles  
From  $0 \rightarrow 2\pi \dots$   
 $\dots b = 3$

7.) Amplitude = 2 Reflection?  Yes  No (circle one) b-value = 3 Midline:  $y = 0$

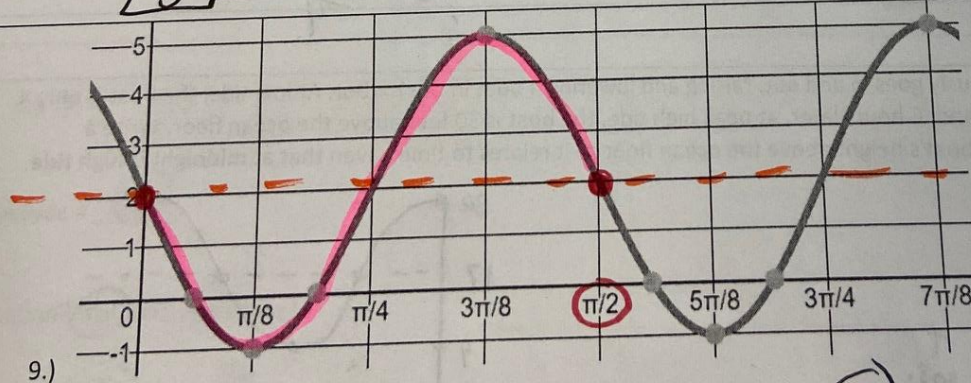
Function:  $y = 2 \cos 3\theta$



$\frac{\pi}{3} = \frac{2\pi}{b}$   
 $\pi \cdot b = 6\pi$   
 $b = \frac{6\pi}{\pi}$

8.) Amplitude =  $\frac{1}{2}$  Reflection?  Yes  No (circle one) b-value = 6 Midline:  $y = 0$

Function:  $y = -\frac{1}{2} \cos 6\theta$



$\frac{\pi}{2} = \frac{2\pi}{b}$   
 $\pi \cdot b = 4\pi$   
 $b = \frac{4\pi}{\pi} = 4$

9.) Amplitude = 3 Reflection?  Yes  No (circle one) b-value = 4 Midline:  $y = 2$

Function:  $y = -3 \sin 4\theta + 2$

10.) A Ferris Wheel is 170 feet in diameter and is boarded from a platform that is 4 feet above the ground at the bottom of the Ferris Wheel. The ride completes 5 revolutions in 7 minutes. Write a function that models the height of the wheel in terms of the time in seconds.

$$7 \text{ min} \rightarrow \frac{420 \text{ secs.}}{5 \text{ revs}} = 84 \text{ s.} = \frac{2\pi}{B}$$

Period = 84 s. Sin or Cos (circle one) <sup>neg.</sup>

$$84B = 2\pi$$

A = 85, B =  $\frac{\pi}{42}$ , K = 89

Function:  $h = -85 \cos \frac{\pi}{42} \cdot t + 89$   $B = \frac{2\pi}{84}$

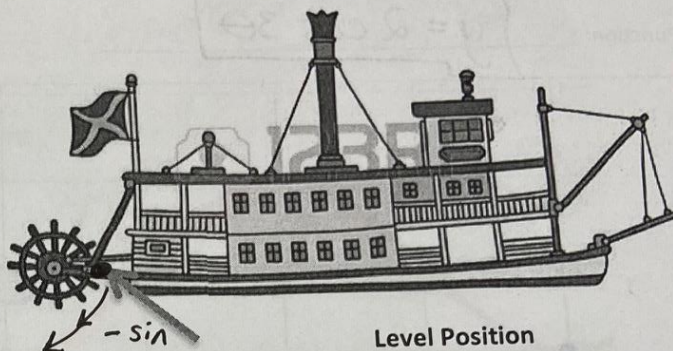
11.) The Proud Mary is a riverboat that has a 20 foot diameter paddlewheel behind it. As it turns at 15 revolutions per minute, the wheel goes 4 feet below the surface of the water. There is a marker on one of the paddles that helps track the movement of the wheel. When  $t = 0$ , the marker is at a level position close to the boat and as the wheel begins to turn, it rotates down toward the water. Write a function that models the height of the wheel in terms of the time in seconds.

Period = 4 s. Sin or Cos (circle one) <sup>neg.</sup>

A = 10, B =  $\frac{\pi}{2}$ , K = ~~10~~ 6

Function:

$$h = -10 \sin \frac{\pi}{2} t + 6$$



$$\frac{60 \text{ secs.}}{15 \text{ revs}} = 4 \text{ s.} = \frac{2\pi}{B}$$

$$4B = 2\pi$$

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

12.) Each day, the tide continuously goes in and out, raising and lowering a boat in the harbor. At low tide, the boat is only 4 feet above the ocean floor and, 6 hours later, at peak high tide, the boat is 30 feet above the ocean floor. Write a function that describes the boat's height above the ocean floor as it relates to time, given that at midnight is high tide

$$12 = \frac{2\pi}{B}$$

Period = 12 hrs. Sin or Cos (circle one) <sup>+</sup> <sub>pos.</sub>

A = 13, B =  $\frac{\pi}{6}$ , K = 17

Function:  $h = 13 \cos \frac{\pi}{6} t + 17$

