

Name: _____

Date: _____

GENERAL SINUSOIDAL FUNCTIONS ALGEBRA 2H

We now have seen all of the basic transformations of the sine and cosine functions. More will be explored in further math classes. But for now, we have the following:

The General Form of a Sinusoidal Function – All sine and cosine curves can be placed in the form

$$y = A \sin(Bx - C) + D \text{ or } y = A \cos(Bx - C) + D$$

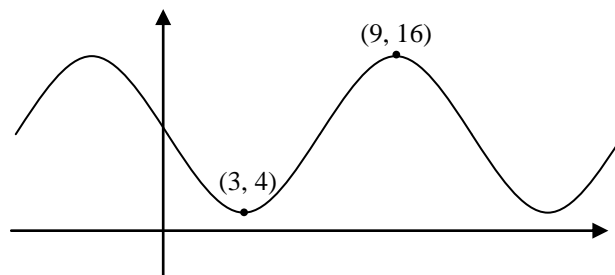
where $|A|$ is the amplitude, $|B|$ is the frequency, C is the horizontal/phase shift, and D is the vertical shift (average value or midline of the function).

Exercise #1: For the function $y = 3 \sin\left(2x + \frac{\pi}{2}\right) + 5$ find the average value, the range, the phase shift, and the period of this function.

Exercise #2: Sketch an accurate graph of $y = 2 \sin\left(\frac{\pi}{3}x - \pi\right) + 4$. Include *at least* two full periods. Identify the coordinates of the turning points of the graph.

Exercise #3: Sketch an accurate graph of $y = 4\cos\left(\frac{\pi}{2}x + \pi\right) - 1$. Include *at least* two full periods. Identify the coordinates of the turning points of the graph.

Exercise #7: Find two equations, one involving the sine function and one involving the cosine function, that could model the graph shown below. Start by determining the amplitude, midline, and period of the function.



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For the sinusoidal functions in problems 1 and 2, identify the range, the period, the average value (vertical shift) and the phase shift of the function.

1. $y = 5\sin 3x + 18 - 4$

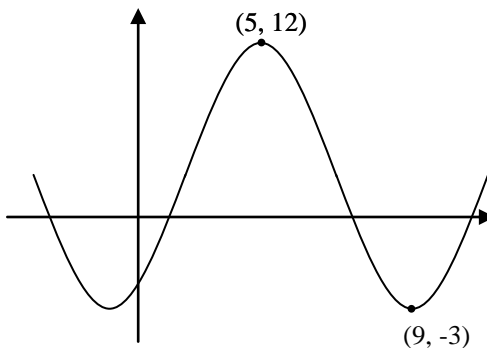
2. $y = -2\cos\left(\frac{\pi}{7}x - 2\pi\right) + 3$

3. Sketch an accurate graph of $y = 5\sin\left(\frac{\pi}{4}x - \frac{3\pi}{4}\right) - 2$. Include *at least* two full periods.

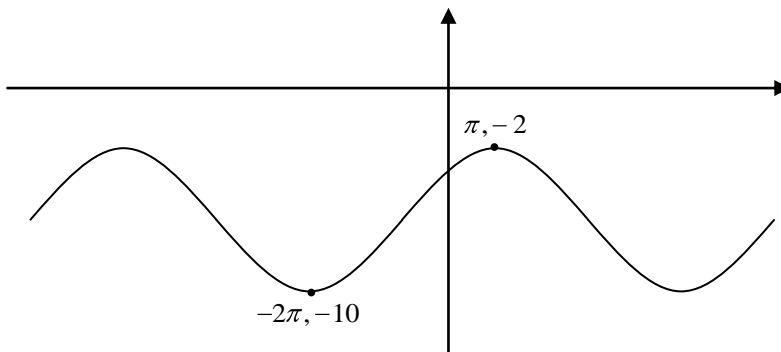
4. Sketch an accurate graph of $y = 3\cos\left(\frac{\pi}{2}x + 2\pi\right) - 2$. Include *at least* two full periods.

For problems 5 through 7, determine one sinusoidal equation that could model the graph shown. It may be in terms of cosine or sine.

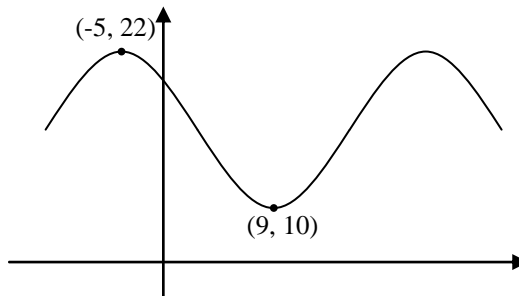
5.



6.



7.



8. Marie is riding a Ferris wheel and keeping track of her height, h , as a function of horizontal distance, x . She is at her lowest point on the ride at $x = 0$. The graph below shows a section of her height function. Determine an equation that could model her height.

