

Sec 4.5 Sine and Cosine
Graphs White-board
REVIEW

1 Explore

Identify the amplitude, period, frequency, vertical shift and phase shift for each of the following functions.

A $y = 2\sin\left(\frac{1}{2}x\right) + 4$

Amp = 2
Period = $\frac{2\pi}{\frac{1}{2}} = 4\pi$
Freq = $\frac{1}{2}$
V.S = 4
P.S = \emptyset

B $y = -8\sin(6x)$

Amp = 8
Period = $\frac{2\pi}{6} = \frac{\pi}{3}$
Freq = 6
V.S = \emptyset
Ph = \emptyset

2 Explore

Identify the amplitude, period, frequency, vertical shift and phase shift for each of the following functions.

A $y = \sin\left(\frac{2x}{5}\right)$

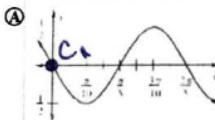
Amp = 1
Period = $\frac{2\pi}{\frac{2}{5}} = 5\pi$
Freq = $\frac{2}{5}$
V.S = \emptyset
H.S = \emptyset

B $y = 5 - 2\sin\left(\frac{2x}{3}\right)$

Amp = 2
Period = $\frac{2\pi}{\frac{2}{3}} = 3\pi$
Freq = $\frac{3}{2}$
V.S = 5
P.h. = \emptyset

3 Explore

Examine the graph below and determine the amplitude, period, phase shift, and vertical shift of the function. Then write an equation of the function.

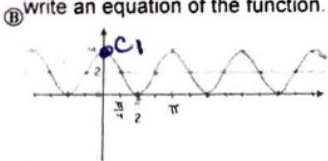


Amp = $\frac{1}{2}$
Period $\frac{2\pi}{5}$
Freq = $\frac{2\pi}{5} = \frac{2\pi}{b}$
 $b = \frac{10\pi}{2\pi} = 5$
P.S = NA
V.S = NA

$y = \frac{1}{2} \sin 5x$

2 Explore

Examine the graph below and determine the amplitude, period, phase shift, and vertical shift of the function. Then write an equation of the function.

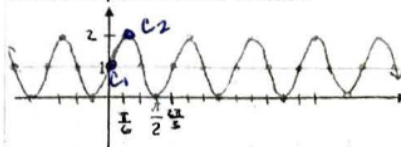


Amp = 2
Period = π , $b = 2$
P.S = 0
V.S = 2

$y = 2 + 2\cos 2x$

4 Explore

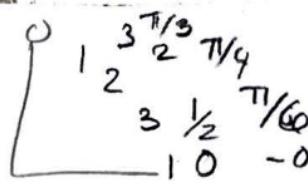
Examine the graph below and determine the amplitude, period, phase shift, and vertical shift of the function. Then write an equation of the function.



Amp = 1
Per = $\frac{2\pi}{3}$, $b = 3$
P.S = $\frac{\pi}{6}$
V.S. = 1

$y = \sin(3x) + 1$
 $y = \cos\left(3\left(x - \frac{\pi}{6}\right)\right) + 1$

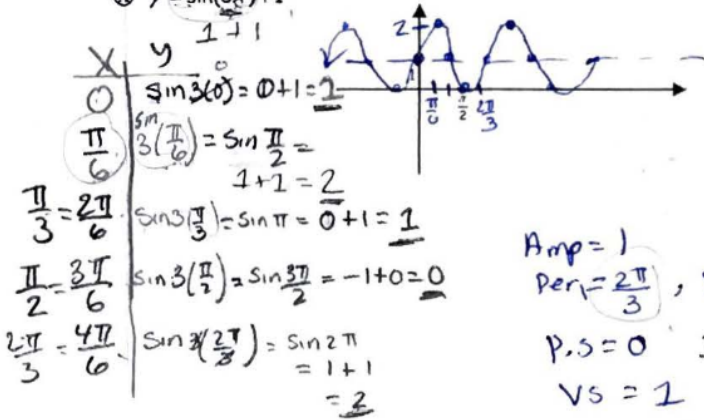
$\frac{2\pi}{3} = \frac{2\pi}{b}$
 $\frac{2\pi}{3} = \frac{6\pi}{2\pi}$
 $b = 3$



5 Explore

Graph each of the functions. List the amplitude, period, phase shift and vertical shift.

Ⓐ $y = \sin(3x) + 1$



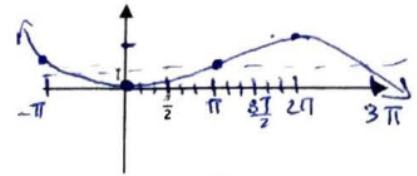
Amp = 1
 Peri = $\frac{2\pi}{3}$, b = 3
 P.S. = 0 Inc = $\frac{2\pi}{3}$
 V.S. = 1
 $\frac{2\pi}{3} \cdot \frac{1}{4} = \frac{1}{2}$

Inc = $\frac{\pi}{6}$

6 Explore

Graph each of the functions. List the amplitude, period, phase shift and vertical shift.

Ⓑ $y = 1 - \cos\left(\frac{x}{2}\right)$



Amp = 1
 Peri = $\frac{2\pi}{1/2} = 4\pi$
 P.S. = 0
 V.S. = 1
 Inc = $\frac{4\pi}{4} = \pi$

x	y
0	$1 - \cos\left(\frac{0}{2}\right) = 1 - 1 = 0$
π	$1 - \cos\left(\frac{\pi}{2}\right) = 1 - 0 = 1$
2π	$1 - \cos\left(\frac{2\pi}{2}\right) = 1 - 1 = 0$
3π	$1 - \cos\left(\frac{3\pi}{2}\right) = 1 - 0 = 1$
4π	$1 - \cos\left(\frac{4\pi}{2}\right) = 1 - 1 = 0$

7 Explore

Write the equation of a function with the given characteristics.

Ⓐ Cosine Function
 Amplitude = 2

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

Vertical shift = 1

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

$6\pi = b\pi$

$6 = b$

Ⓑ Sine Function

Amplitude = 3

Period = 8π

Phase Shift = $\frac{\pi}{2}$

Reflection in the x-axis

$\frac{2\pi}{b} = \frac{8\pi}{1}$

$\frac{2\pi}{8\pi} = \frac{8\pi}{8\pi}$

$\frac{1}{4} = b$

$y = 2\cos(6(x)) + 1$

$y = -3\sin\left(\frac{1}{4}\left(x - \frac{\pi}{2}\right)\right)$

8 Explore

Write the equation of a function with the given characteristics.

Ⓐ Cosine Function
 amplitude = 1
 period = $2\pi \rightarrow b = 1$
 phase shift = $\frac{5\pi}{6}$
 vertical shift = 3

$y = \cos\left(x - \frac{5\pi}{6}\right) + 3$

Ⓑ Sine Function
 amplitude = $\frac{1}{2}$
 period = $\frac{\pi}{3} \rightarrow$
 vertical shift = -4

$y = \frac{1}{2}\sin(6x) - 4$

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