More Practice with Sine and Cosine Graphs

Determine the amplitude and period of each function.

1. $y = \sin 4x$

Amplitude 1

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

2. $y = \cos 5x$

Amplitude 1

Period $\frac{2\pi}{5}$

3. $y = 2 \sin x$

Amplitude 2

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

4. $y = -4 \sin 3x$

Amplitude 4

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

5. $y = 2 \sin (-4x)$

Amplitude 2

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

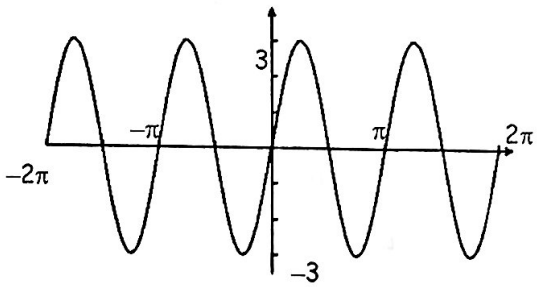
6. $y = 3 \sin \frac{2}{3}x$

Amplitude 3

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

Give the amplitude and period of each function graphed below. Then write an equation of each graph using either sine or cosine.

7.



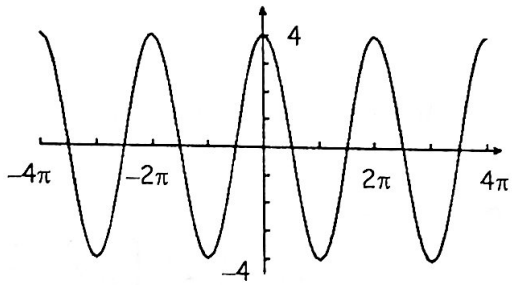
$\frac{2\pi}{b} = \pi$

$b = 2$

Amplitude 3 **Period** π

Equation $y = 3\sin 2x$

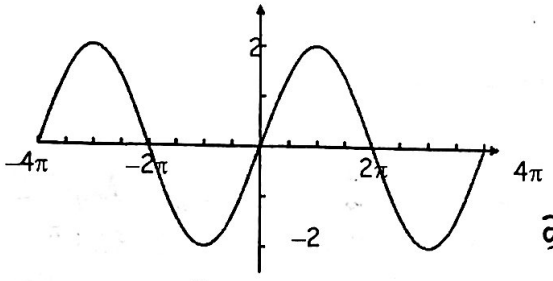
8.



Amplitude 4 **Period** 2π

Equation $y = 4\cos x$

9.

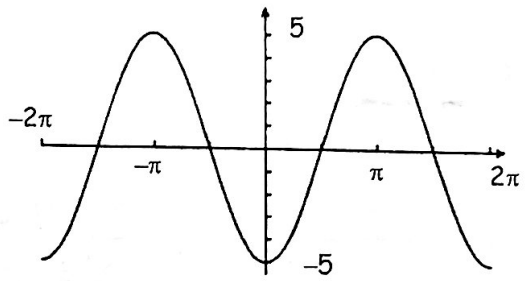


$\frac{2\pi}{b} = 4\pi$

Amplitude 2 **Period** 4π

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

10.

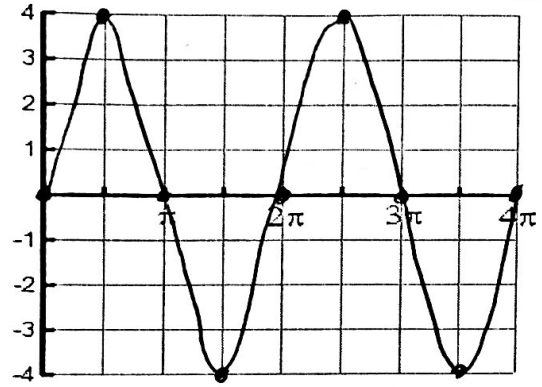


Amplitude 5 **Period** 2π

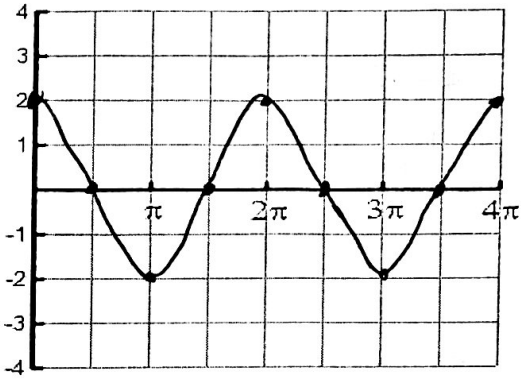
Equation $y = -5\cos x$

Sketch the graph of each function.

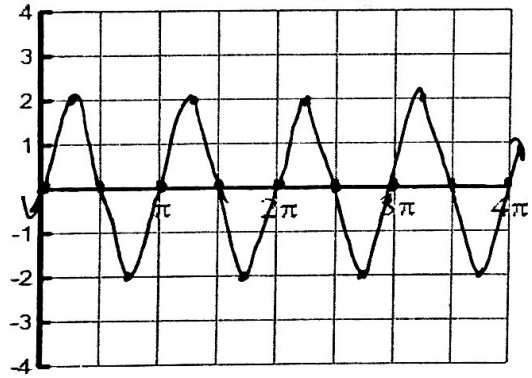
11. $y = 4 \sin x$ $Pd = 2\pi$ $\frac{2\pi}{4} = \boxed{\frac{\pi}{2}}$



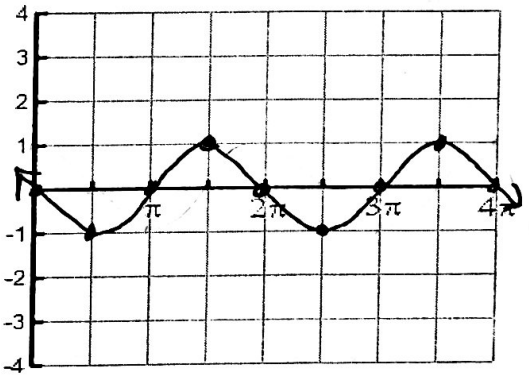
12. $y = 2 \cos x$



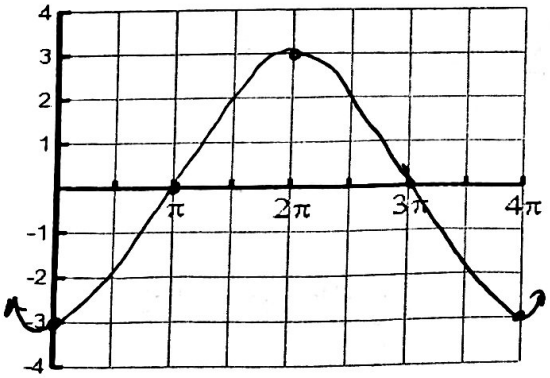
13. $y = 2 \sin 2x$ $\frac{2\pi}{2}$



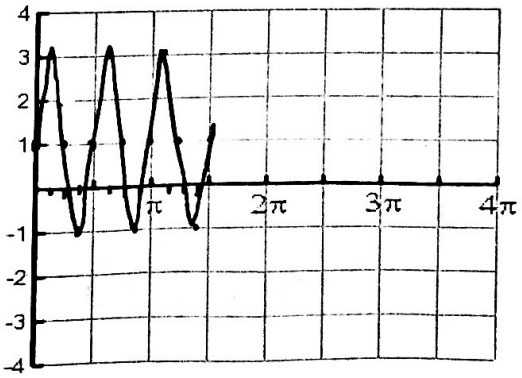
14. $y = -\cos\left(x - \frac{\pi}{2}\right)$



15. $y = -3 \cos \frac{1}{2}x$ $\frac{2\pi}{\frac{1}{2}} = 4\pi$



16. $y = 2 \sin (4x) + 1$ $Pd = \frac{2\pi}{4} = \frac{\pi}{2}$



Determine the amplitude, period, phase shift, and vertical shift for each.

17. $y = 2 + 3\sin\left(4x + \frac{\pi}{2}\right)$

Amplitude 3

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

Phase Shift $\leftarrow \frac{\pi}{8}$

Vertical Shift $\uparrow 2$

18. $y = 2\cos(x - \pi)$

Amplitude 2

Period 2π

Phase Shift $\rightarrow \pi$

Vertical Shift —

19. $y = \frac{1}{2}\cos 2x - 4$

Amplitude $\frac{1}{2}$

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

Phase Shift —

Vertical Shift $\downarrow 4$

20. $y = 4\sin(x - \pi) - 3$

Amplitude 4

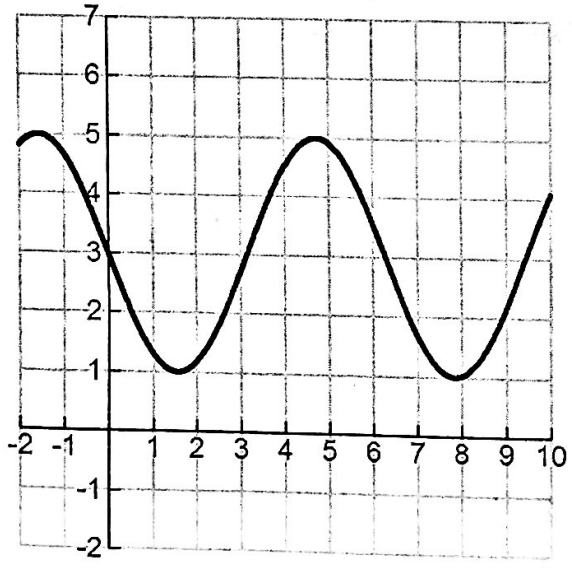
Period 2π

Phase Shift $\rightarrow \pi$

Vertical Shift $\downarrow 3$

Identify the equation of the graphs below for each Sine and Cosine.

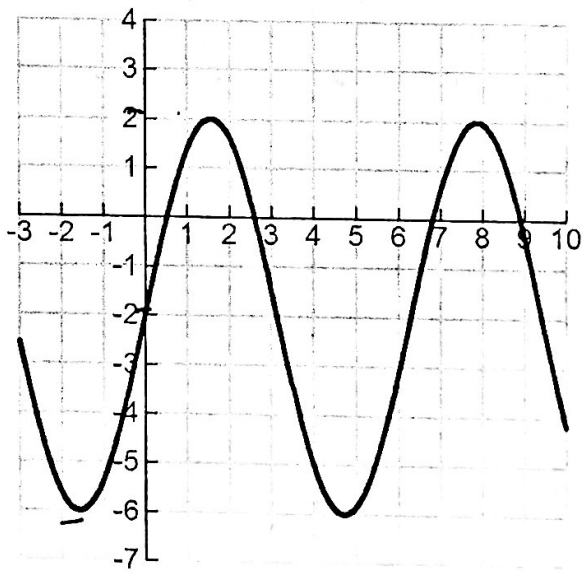
21.



Sine Equation $y = -2\sin x + 3$

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

22.



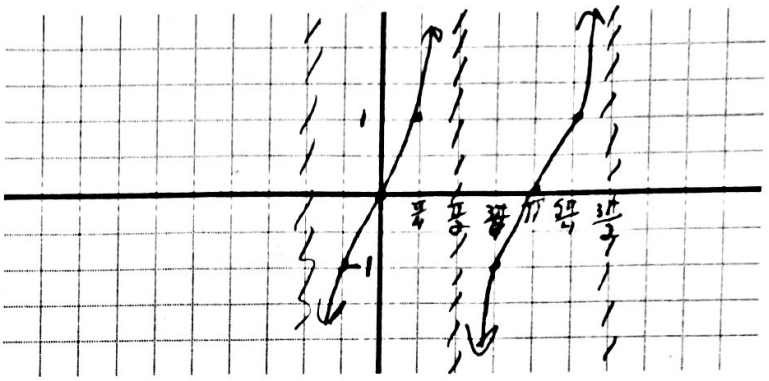
Sine Equation $y = 4\sin x - 2$

Cosine Equation $y = -4\cos\left(x + \frac{\pi}{2}\right) - 2$

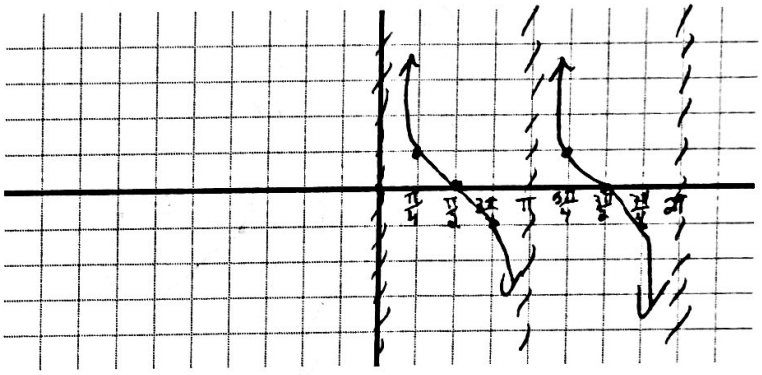
Graph each trigonometric function.

1) $y = \tan x$

x	y
0	$\frac{0}{1} = 0$
$\frac{\pi}{4}$	1
$\frac{\pi}{2}$	Und Asymptote
$\frac{3\pi}{4}$	-1
π	0
$\frac{5\pi}{4}$	1
$\frac{3\pi}{2}$	Undef. Asymptote

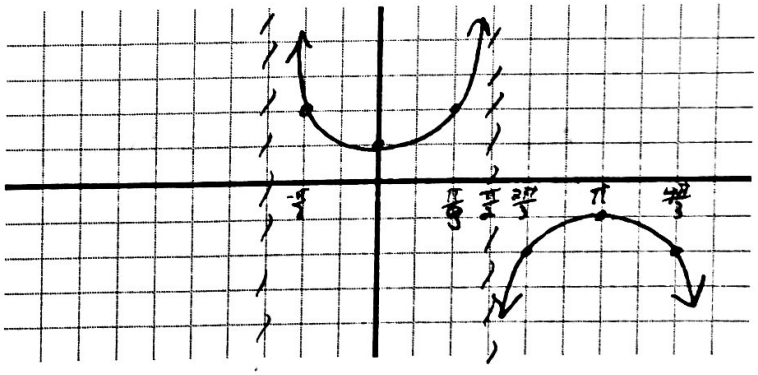


2) $y = \cot x$ $= \frac{1}{\tan x}$

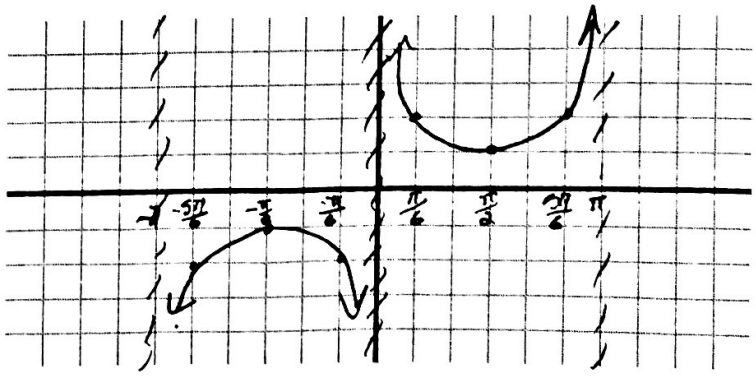


3) $y = \sec x$

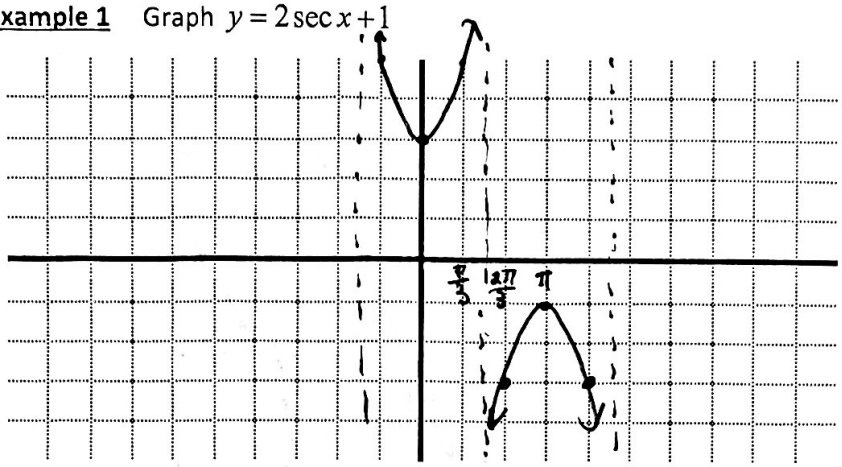
θ	y
0	1
$\frac{\pi}{3}$	2
$\frac{\pi}{2}$	Und
$\frac{2\pi}{3}$	-2
π	-1
$-\frac{\pi}{3}$	2
$\frac{4\pi}{3}$	-2



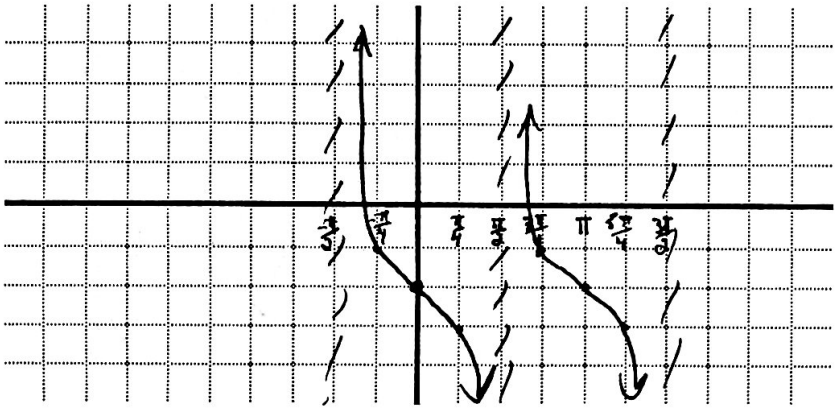
4) $y = \csc x$



Example 1 Graph $y = 2\sec x + 1$



Example 2 Graph $y = \tan(-x) - 2$



Example 3 Describe the transformations used to obtain $f(x) = 3\cot\left(\frac{x}{2}\right) + 1$ from its parent function.

Where are the vertical asymptotes located?

Amp: 3

$\frac{\pi}{b}$ ← Pd: 2π

VS. ↑1

VA: $x = 0 \pm 2\pi k$

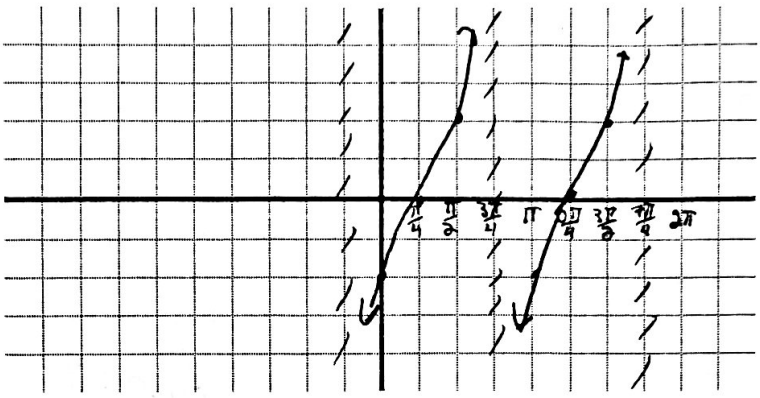
Summary: Basic Trigonometric Functions

Function	Period	Domain	Range	Asymptotes	Zeros	Even/ Odd
$\sin x$	2π	All reals	$[-1, 1]$	None	$n\pi$	Odd
$\cos x$	2π	All reals	$[-1, 1]$	None	$\pi/2 + n\pi$	Even
$\tan x$	π	$x \neq \pi/2 + n\pi$	All reals	$x = \pi/2 + n\pi$	$n\pi$	Odd
$\cot x$	π	$x \neq n\pi$	All reals	$x = n\pi$	$\pi/2 + n\pi$	Odd
$\sec x$	2π	$x \neq \pi/2 + n\pi$	$(-\infty, -1] \cup [1, \infty)$	$x = \pi/2 + n\pi$	None	Even
$\csc x$	2π	$x \neq n\pi$	$(-\infty, -1] \cup [1, \infty)$	$x = n\pi$	None	Odd

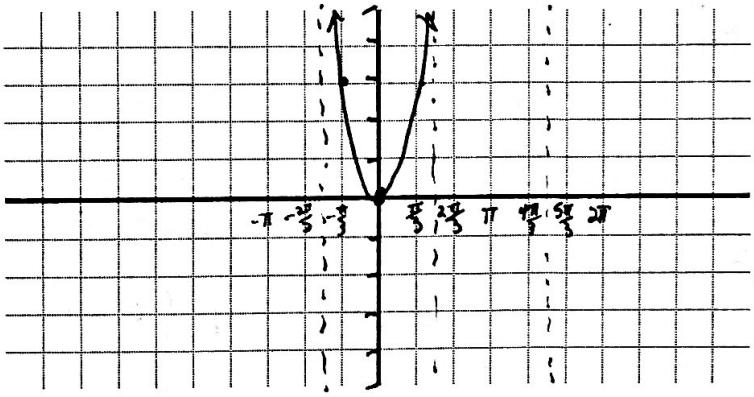
Precalculus Unit 5 Homework—Graphing Other Trig Functions

Graph the function over two periods. Begin your graph at a horizontal shift (as required). Don't forget to label your axes.

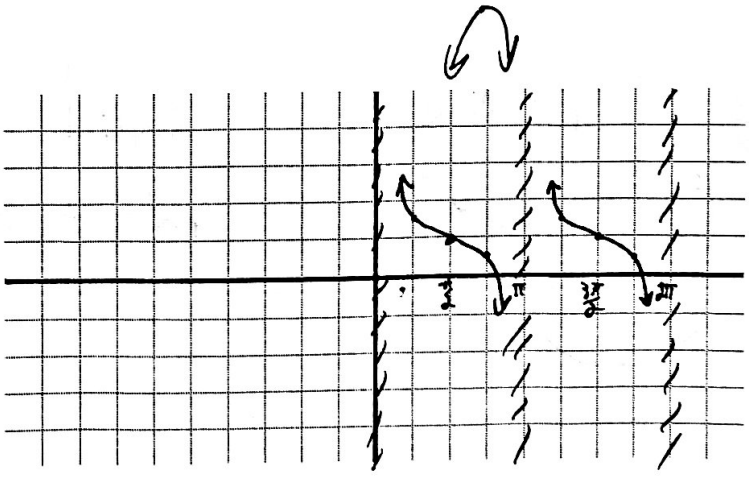
1) $f(x)=2\tan\left(x-\frac{\pi}{4}\right)$



2) $f(t)=3\sec t-3$



3) $f(x)=\frac{1}{2}\cot x+1$



Describe the transformations on each parent function.

4) $g(x)=-6\tan 2\left(x+\frac{\pi}{4}\right)-2$

ref over x
Vert Str. by 6
Pd: $\frac{\pi}{2}$ $\leftarrow\frac{\pi}{4}\downarrow 2$

5) $f(t)=\csc 2t+2$

Pd: π
VS. $\uparrow 2$

6) $h(x)=-\cot(x+\frac{1}{2}\pi)$

ref over x
$\leftarrow\frac{1}{2}\pi$