

10-5 Graphing

Sinusoid: Word to describe a sine or cosine graph

$$f(x) = a \sin(b(x-h)) + k$$

a: Amplitude: $|a|$

b: Period Finder:


$$\text{Period: } \frac{2\pi}{|b|}$$

h: Phase Shift:

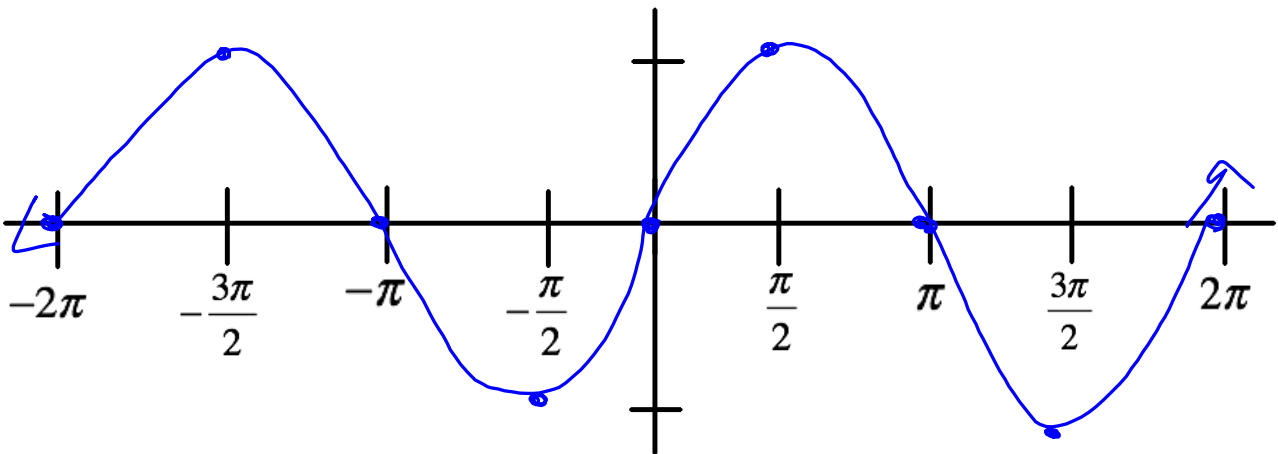
k: Vertical Shift:

~~Frequency:~~ $\frac{|b|}{2\pi}$

Video of sin graph and unit circle:

 https://www.youtube.com/watch?v=Ohp6Okk_tww

Graph $y = \sin x$

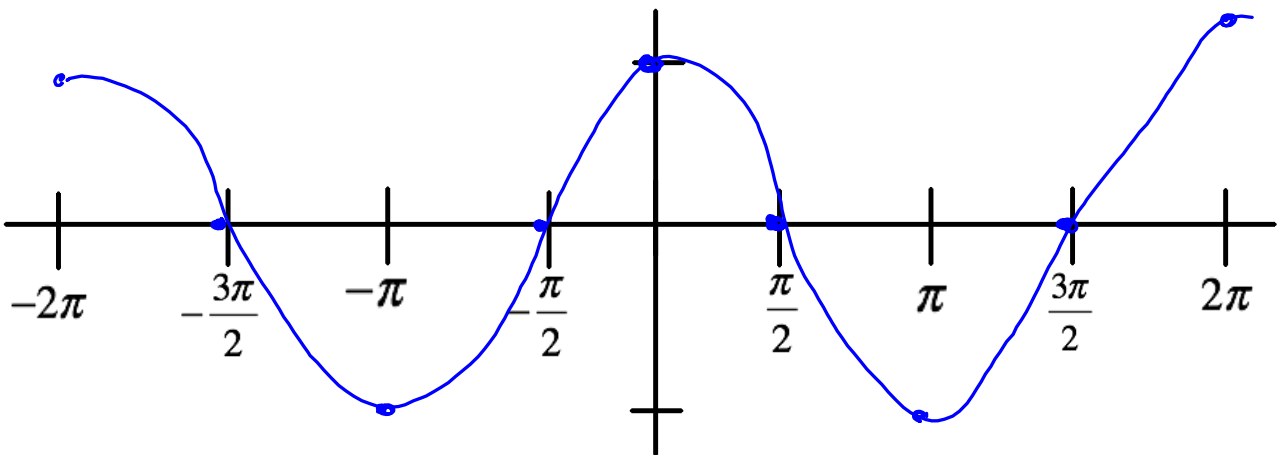


Amplitude: 1

Period: 2π

~~Frequency:~~

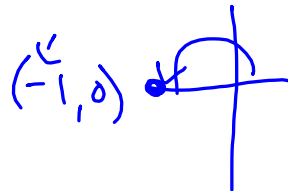
Graph $y = \cos x$



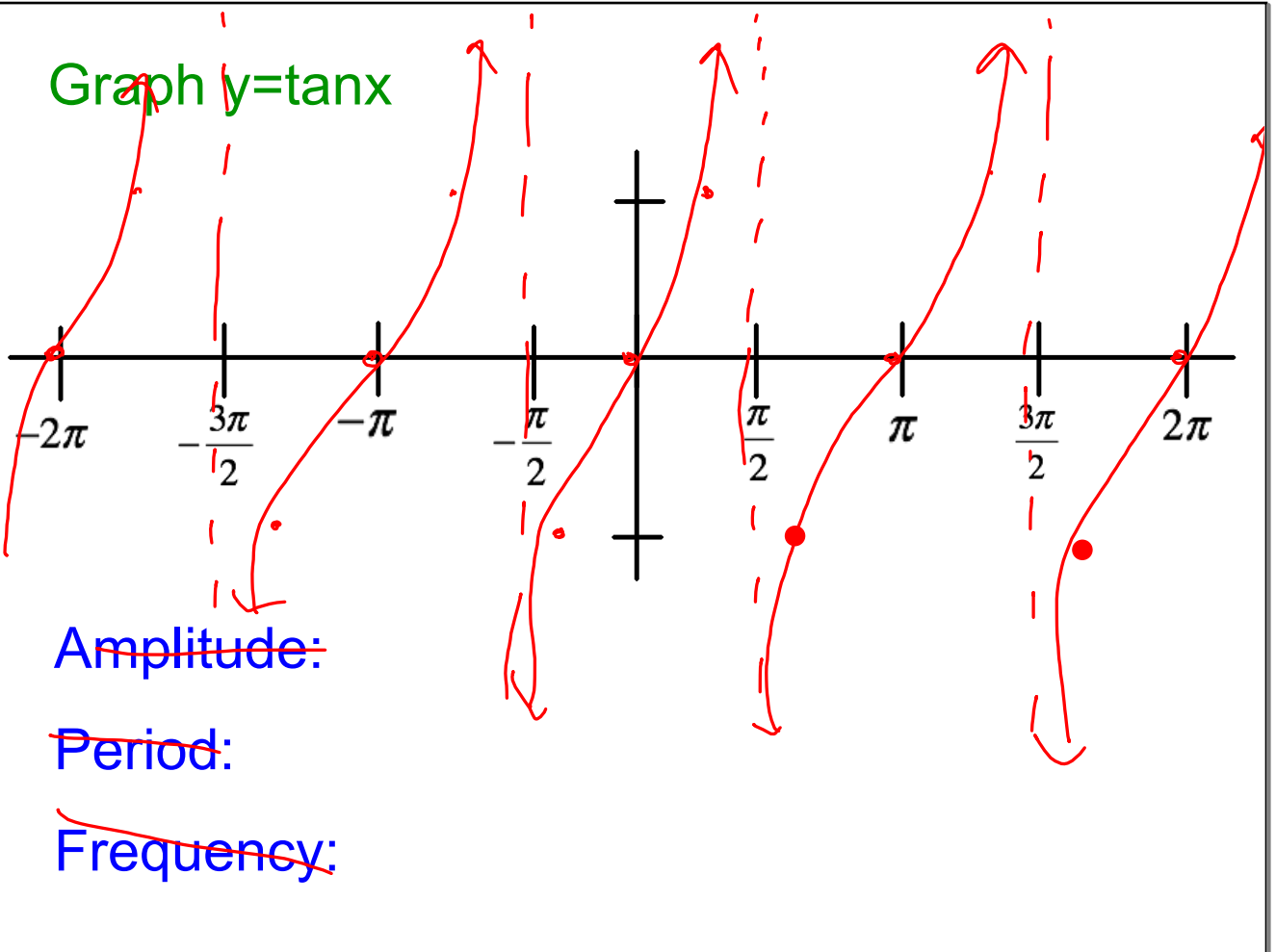
Amplitude: 1

Period: 2π

~~Frequency:~~



Graph $y=\tan x$



~~Amplitude:~~

~~Period:~~

~~Frequency:~~

State the amplitude, period, frequency, phase shift, and vertical shift of each function.

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

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

Amp: 2

Period: $\frac{2\pi}{1/3} = 2\pi \cdot 3 = 6\pi$

~~Frequency:~~

Phase Shift: left $\frac{3\pi}{4}$

Vertical Shift: n/a

$$y = 3 \sin(2x) - 1$$

Amp: 3

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

~~Frequency:~~

Phase Shift: n/a

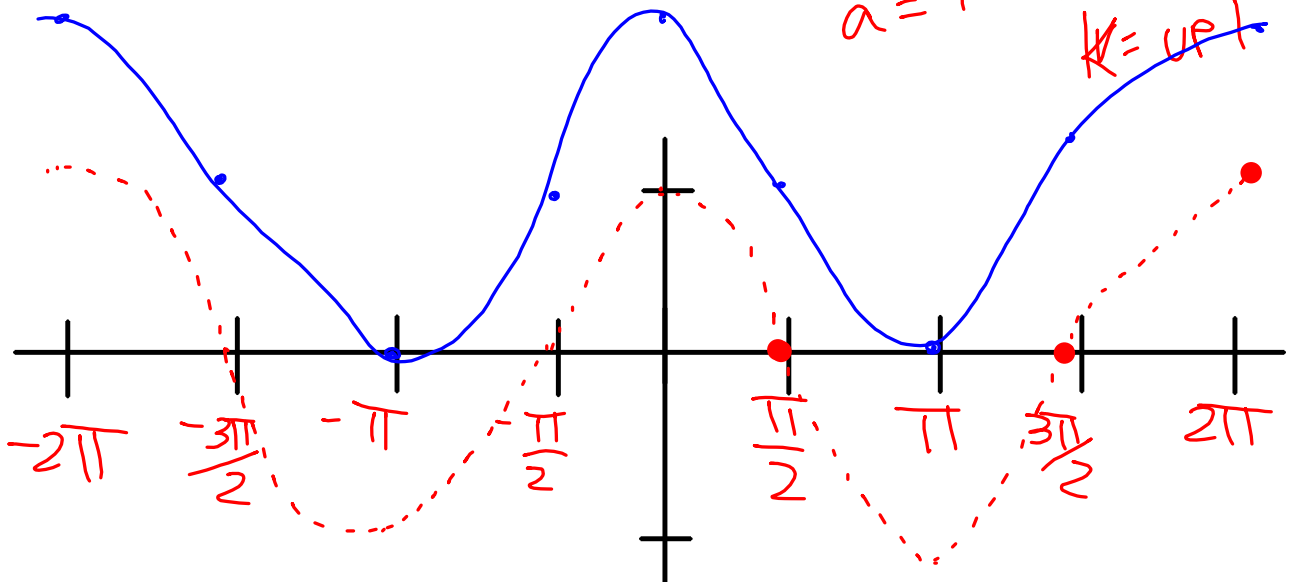
Vertical Shift: down 1

Graphing Tips

- Always graph 2 periods (One in each direction)
- Make 4 tick marks in each direction
- The last tick mark is the period
- Find a , h and k and graph

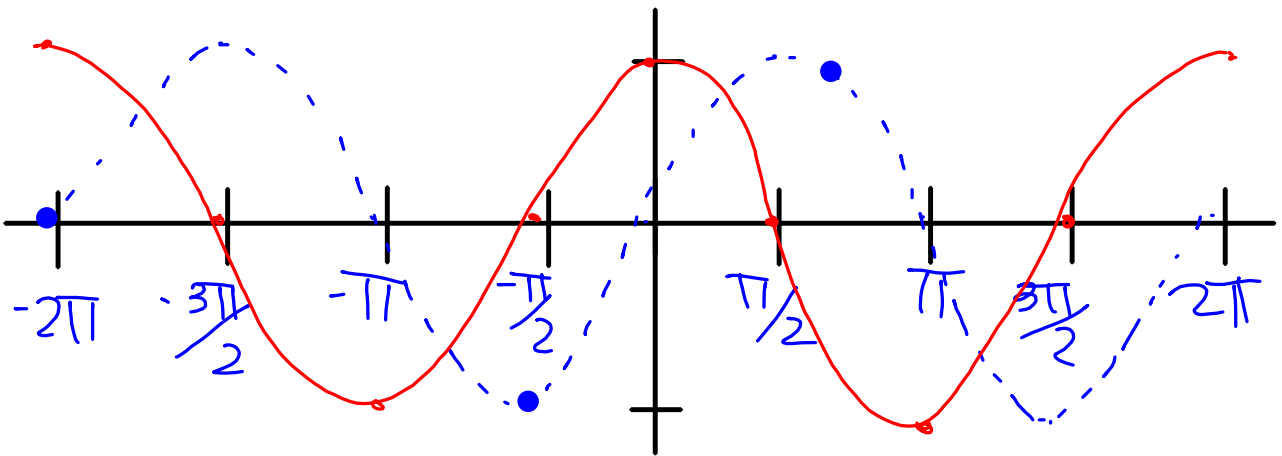
Graph $y = \cos x + 1$

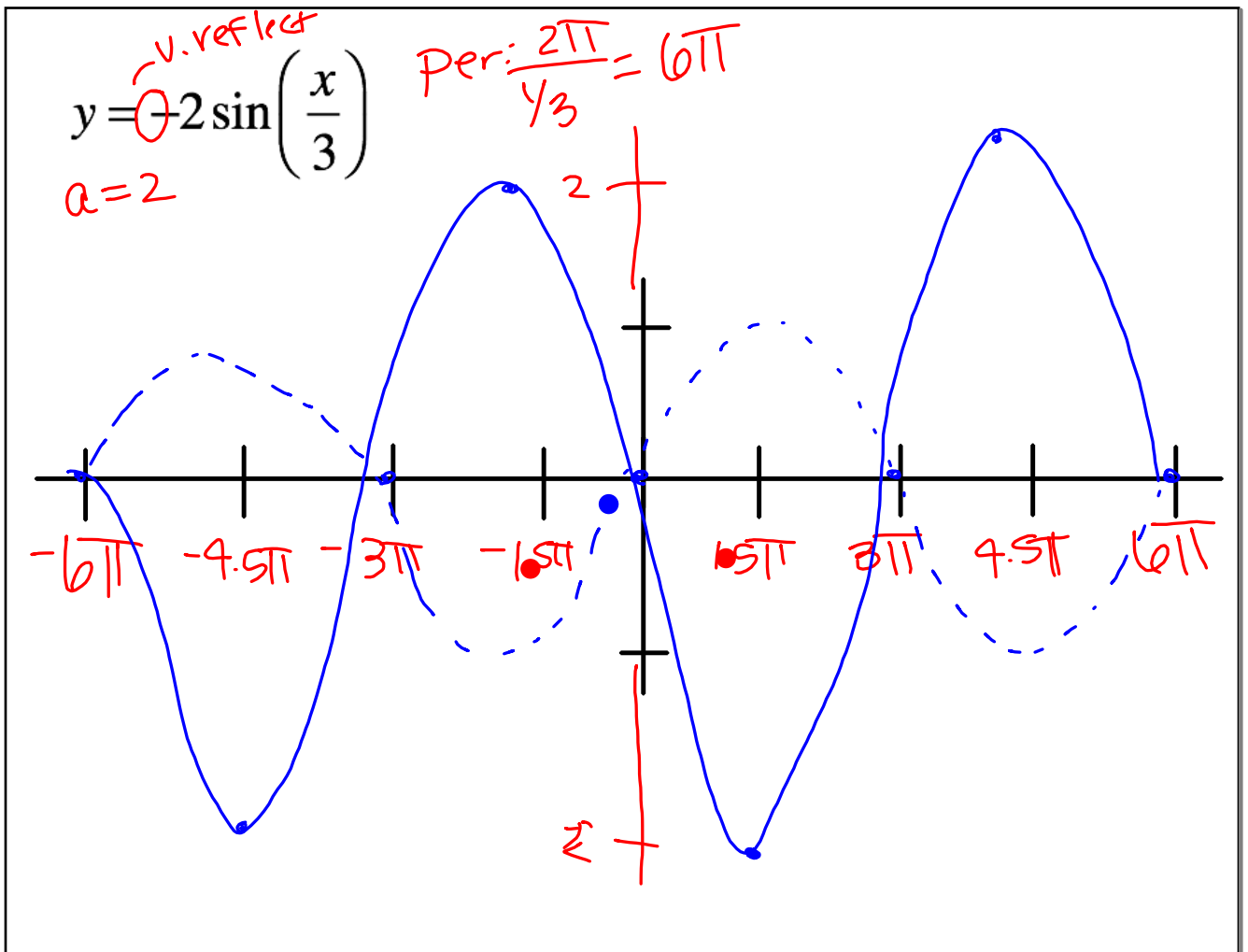
$per = \frac{2\pi}{1} = 2\pi$
 $a = 1$ $h = n/a$
 $k = 1$



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

per. $\frac{2\pi}{1} = 2\pi$
 $a=1$
 left $\frac{\pi}{2}$

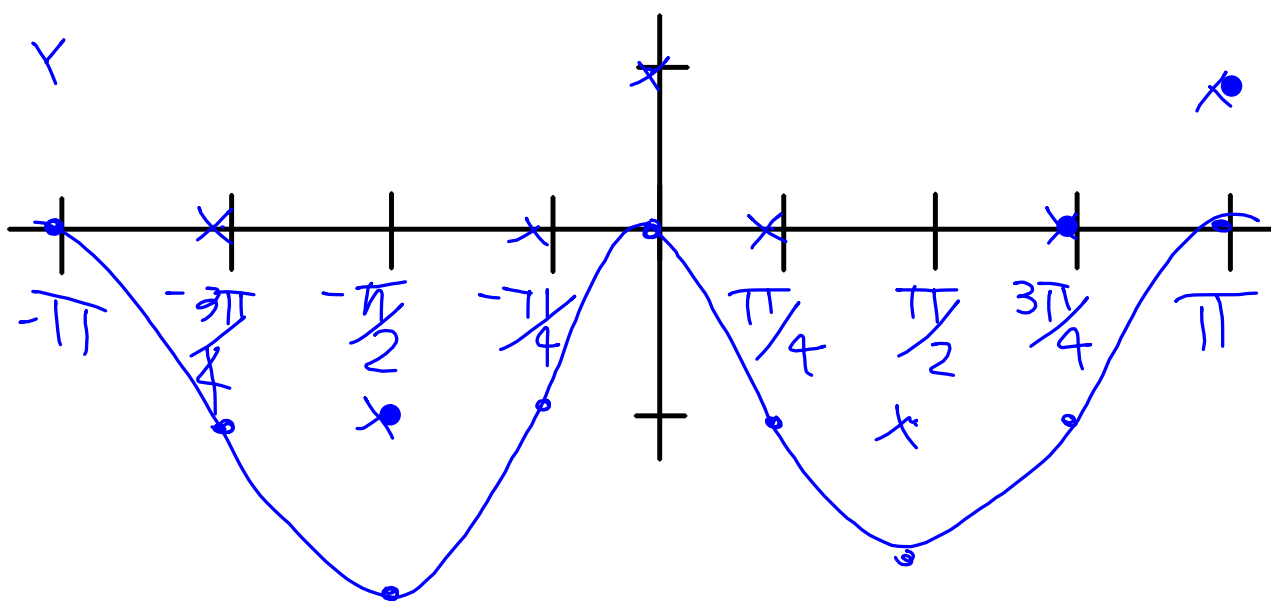




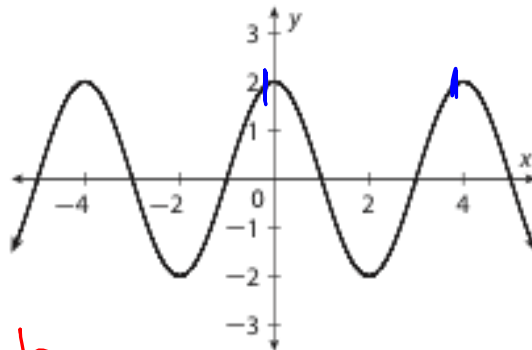
$$y = \cos(2x) - 1$$

$$\text{per} = \frac{2\pi}{2} = \pi$$

$$a =$$



Write an equation to represent the graph



$$a = 2$$

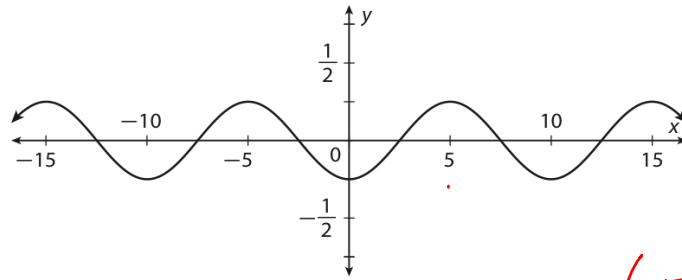
$$\text{per} \bullet \frac{2\pi}{b} = \frac{2\pi}{4}$$

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

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

Write an equation to represent the graph

(B)



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

v. ref.

$$\text{per} = 10 = \frac{2\pi}{b}$$

$$b = \frac{\pi}{5}$$

$$y = -\frac{1}{4} \cos\left(\frac{\pi}{5}x\right)$$

$$y = \frac{1}{4} \sin\left(\frac{\pi}{5}(x - 2.5)\right)$$

7. **Amusement Parks** The height h in feet of a car on a different Ferris wheel can be modeled by $h(t) = -16\cos\frac{\pi}{45}t + 24$, where t is the time in seconds. Identify the period, midline, amplitude, and maximum and minimum values of the graph. For one cycle starting from $t = 0$, find all points where the graph intersects its midline and the coordinates of any local maxima and minima. Interpret these points in the context of the problem, and graph one cycle.

