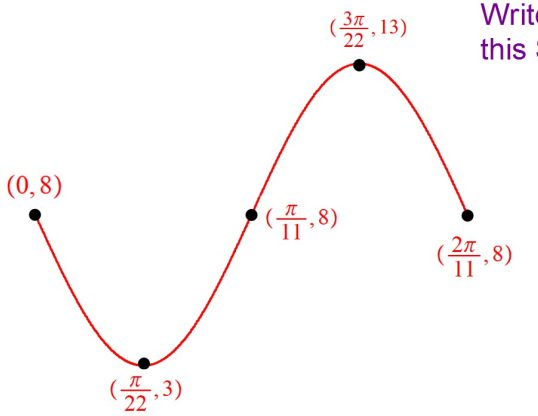
Write the equation of this Sine graph.

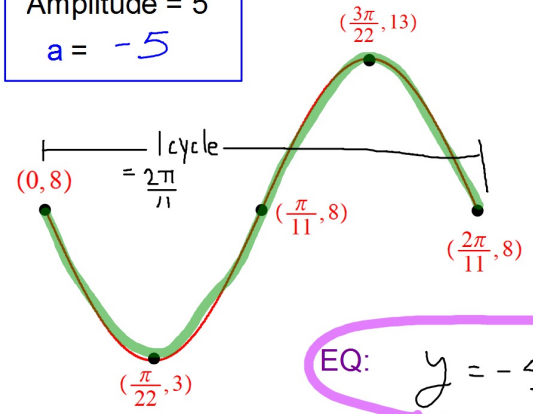


Amplitude = 5

$a = -5$

Midline: $y = 8$

$k = 8$



Period $= \frac{2\pi}{11}$

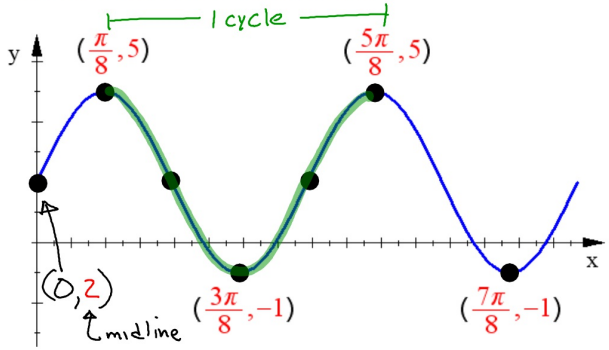
$b = \frac{2\pi}{\frac{2\pi}{11}}$

$= 2\pi \cdot \frac{11}{2\pi}$

$b = 11$

EQ: $y = -5 \sin 11x + 8$

Write the equation of this Sine graph.



Amplitude $= \frac{5 - -1}{2} = 3$

$a = 3$

Midline:

$y = \frac{5 + -1}{2}$ $y = 2$

$k = 2$

Period $= \frac{5\pi}{8} - \frac{\pi}{8}$

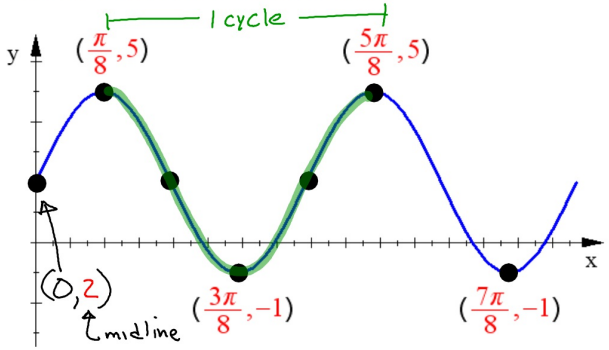
$= \frac{4\pi}{8} = \frac{\pi}{2}$

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

$b = 4$

Equation: $y = 3 \sin 4x + 2$

Write the equation of this Sine graph.



Amplitude $= \frac{5 - -1}{2} = 3$

$a = 3$

Midline:

$y = \frac{5 + -1}{2}$ $y = 2$

$k = 2$

Period $= \frac{5\pi}{8} - \frac{\pi}{8}$

$= \frac{4\pi}{8} = \frac{\pi}{2}$

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

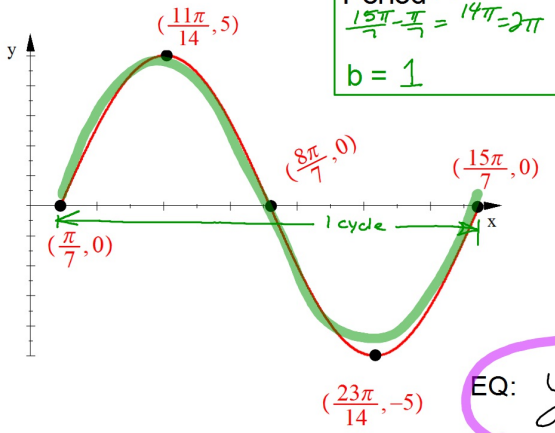
$b = 4$

Equation: $y = 3 \sin 4x + 2$

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

h: Horizontal Shift: Phase Shift

h gives you x-coord of start point.



Period = $\frac{15\pi}{7} - \frac{\pi}{7} = \frac{14\pi}{7} = 2\pi$

b = 1

Amplitude = 5

a = 5

Midline: y = 0

k = 0

Phase Shift: $\frac{\pi}{7}$ right

$(x \pm h) \rightarrow (x - \frac{\pi}{7})$

EQ: $y = 5\sin(x - \frac{\pi}{7})$

$y = \sin bx$

b affects the period
(horiz stretch or shrink)

$y = \sin(x - h)$

h affects the horizontal position.
(horiz translation left or right)

How do you write an equation that has both a b and an h?

$y = \sin(b(x-h))$

Write the equation of this function.

Parent function: Sinx

Phase Shift: $\frac{\pi}{6}$ left

Graph is upside-down

Midline: y = -3

Amplitude = 10

Period = 8π

$b = \frac{2\pi}{8\pi} = \frac{1}{4}$

$y = -10\sin\left(\frac{1}{4}\left(x + \frac{\pi}{6}\right)\right) - 3$

$y = -12\text{Sin}(3(x + \frac{7\pi}{10}))$

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

Amplitude = 12

Phase Shift:

$\frac{7\pi}{10}$ Left

Eq of Midline:

$y = 0$

$y = a\text{Sin}(b(x \pm h)) \pm k$

a ⟶ Vert strecth or shrink - Amplitude
Also x-axis reflection if negative

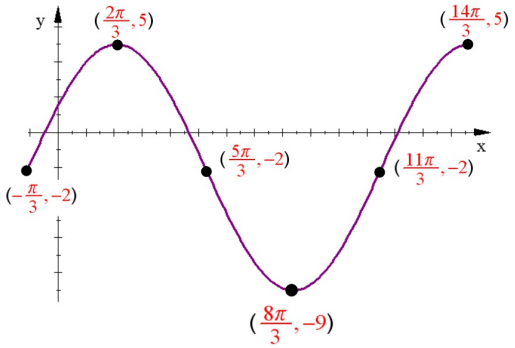
b ⟶ Horiz stretch or shrink Period = 2π/b and b = 2π/Period

h ⟶ Phase Shift - Horiz translation - the x-coord of start point

k ⟶ Vertical translation - Equation of the Midline

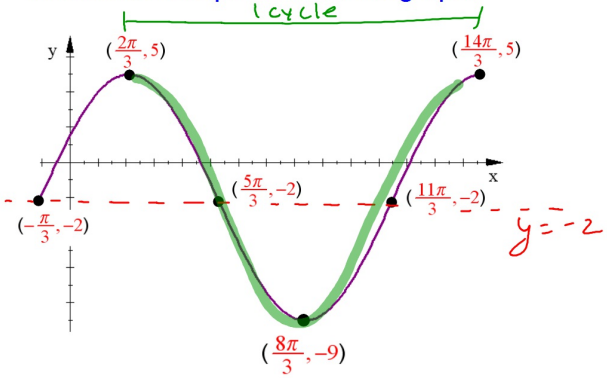
gives you y-coord of start pt (and pts on midline)

Write a Sine equation for this graph.



EQ:

Write a Sine equation for this graph.



Amplitude = $5 - -2 = 7$

$a = 7$ if START AT $(-\pi/3, -2)$

Eq of Midline: $y = -2$

$k = -2$

Phase Shift: $\frac{\pi}{3}$ Left

if start at $(-\frac{\pi}{3}, -2)$

Period = $\frac{14\pi}{3} - \frac{2\pi}{3} = \frac{12\pi}{3} = 4\pi$

$b = \frac{2\pi}{4\pi} = \frac{1}{2}$

EQ: $y = 7\sin(\frac{1}{2}(x + \pi/3)) - 2$

Write a Sine equation for this graph.