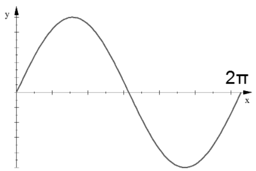
The Parent Function:
y = Sinx

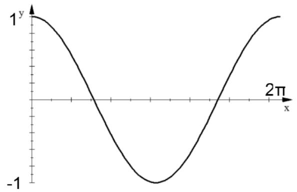


Period= 2π

Amplitude= 1

Eq of Midline: y = 0

The Parent Function:
y = Cosx



Period= 2π

Amplitude= 1

Eq of Midline: y = 0

How are the graphs of Cosx and Sinx the SAME?

The have the same Period, Amplitude, and Midline.

Both Parent Functions"start"
on the y-axis (x=0)

How are the graphs of Cosx and Sinx DIFFERENT?

Where they start.

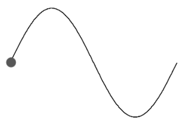
Sine Function starts on the midline

Cosine Function starts at a Maximum or a Minimum(upside down)

Starting points for
y = aSin/Cosx

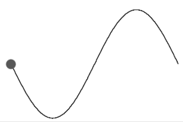
Sine Graphs

Positive **a**



Starts
on the Midline
and goes UP

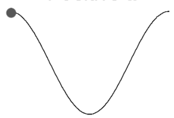
Negative **a**



Starts
on the Midline
and goes
DOWN

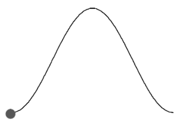
Cosine Graphs

Positive **a**



Starts
at a Max

Negative **a**



Starts
at a Min

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

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

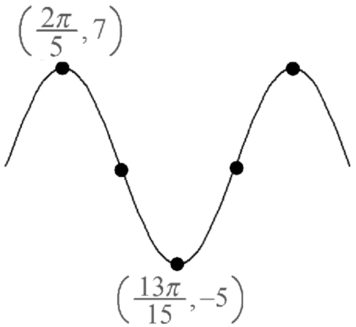
b ⟶ Horiz stretch or shrink Period = 2π/b and b = 2π/Period

h ⟶ Phase Shift - Horiz translation - the starting point

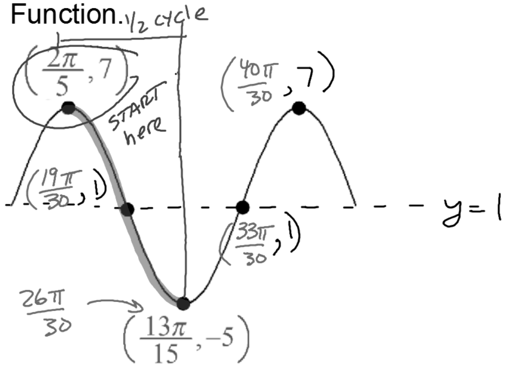
k ⟶ Vertical translation - Equation of the Midline

gives you y-coord of pts on midline

1. Fill in the missing coordinates and write the equation of this Cosine Function.



1. Fill in the missing coordinates and write the equation of this Cosine Function.



To find missing x-coord:

$\frac{1}{4}$ period $= \frac{14\pi}{15} \cdot \frac{1}{4} = \frac{7\pi}{30}$

START AT $\frac{2\pi}{5} = \frac{12\pi}{30}$ &

Keep adding $\frac{7\pi}{30}$

midline: $y = \frac{7+-5}{2} = 1$

Amplitude $= \frac{7--5}{2} = 6$

$a = 6$

period $= \left(\frac{13\pi}{15} - \frac{2\pi}{5}\right)2$

$= \left(\frac{13\pi}{15} - \frac{6\pi}{15}\right)2$

$= \frac{7\pi}{15} \cdot 2 = \frac{14\pi}{15}$

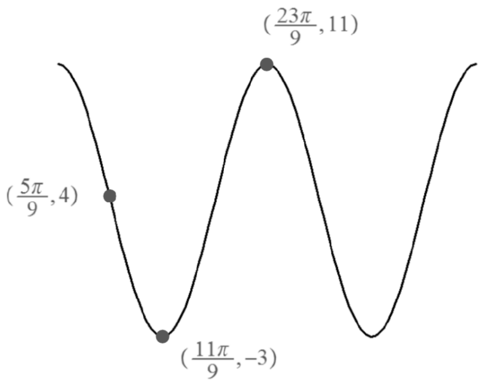
$b = 2\pi / \frac{14\pi}{15} = 2\pi \cdot \frac{15}{14\pi} = \frac{15}{7}$

if START AT $\left(\frac{2\pi}{5}, 7\right)$

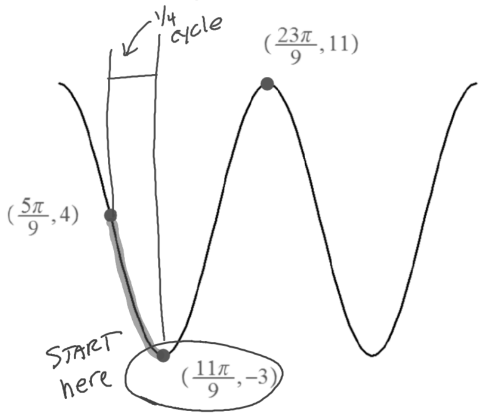
$a > 0$ & phase shift is $\frac{2\pi}{5}$ right

EQ: $y = 6\cos\left(\frac{15}{7}\left(x - \frac{2\pi}{5}\right)\right) + 1$

1. Write the equation of this transformed Cosine Function.



1. Write the equation of this transformed Cosine Function.



midline: $y = 4$ $k = 4$

Amplitude $= 7$

$a = -7$

phase shift $\frac{11\pi}{9}$ RT

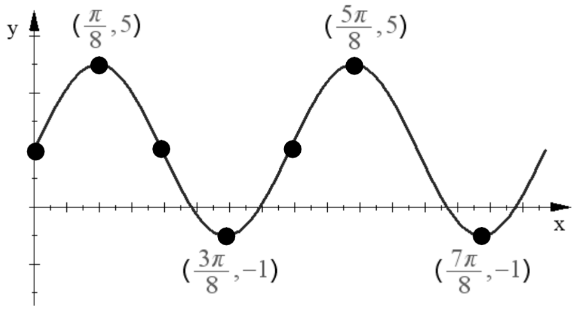
Period: $\left(\frac{11\pi}{9} - \frac{5\pi}{9}\right)4$

$= \frac{6\pi}{9} \cdot 4 = \frac{8\pi}{3}$

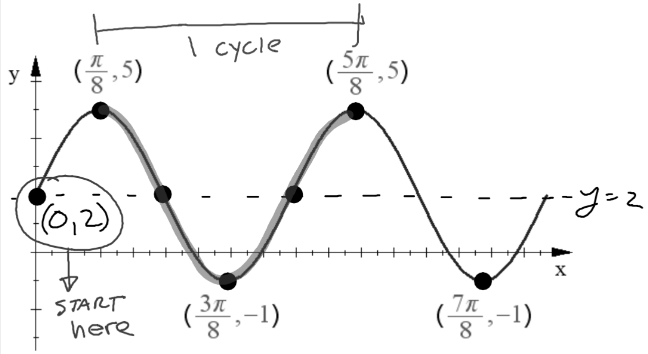
$b = \frac{2\pi}{\frac{8\pi}{3}} = 2\pi \cdot \frac{3}{8\pi} = \frac{3}{4}$

EQ: $y = -7\cos\left(\frac{3}{4}\left(x - \frac{11\pi}{9}\right)\right) + 4$

Write the equation of this graph as a Sine and Cosine Function:



Write the equation of this graph as a Sine Function:



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

$K = 2$

Amplitude $= 5-2$
$= 3$

$a = 3$

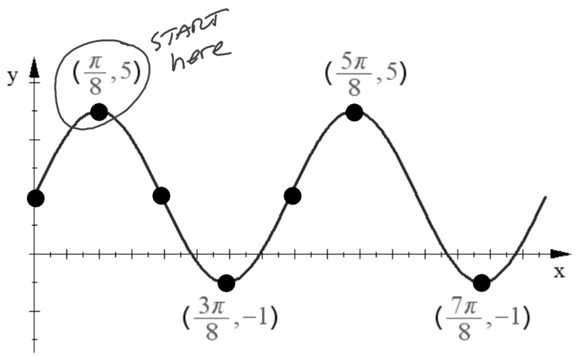
phase shift: NONE

Period $= \frac{5\pi}{8} - \frac{\pi}{8}$
$= \frac{4\pi}{8} = \frac{\pi}{2}$

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

EQ: $y = 3\sin(4x) + 2$

Write the equation of this graph as a Cosine Function:



Same period, Amplitude & midline

$b = 4$

$a = 3$ (pos because start at a max)

$K = 2$

phase shift: $\pi/8$ RT

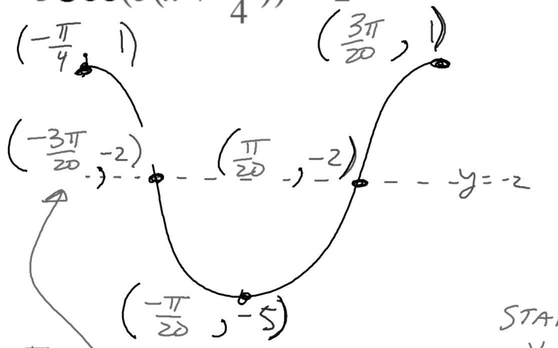
EQ: $y = 3\cos(4(x - \pi/8)) + 2$

Graph one period of this function. Label the coordinates of all x-intercepts, Maximums, and Minimums.

$y = 3\cos(5(x + \frac{\pi}{4})) - 2$

Graph one period of this function. Label the coordinates of all x-intercepts, Maximums, and Minimums.

$$y = 3\text{Cos}(5(x + \frac{\pi}{4})) - 2$$



$-\frac{\pi}{4} + \frac{\pi}{10}$

$= -\frac{5\pi}{20} + \frac{2\pi}{20}$

Amp = 3

midline: $y = -2$

period $= \frac{2\pi}{5}$

phase shift

$\frac{\pi}{4}$ Left

$\frac{1}{4}$ of a period

$= \frac{1}{4} \cdot \frac{2\pi}{5} = \frac{\pi}{10}$

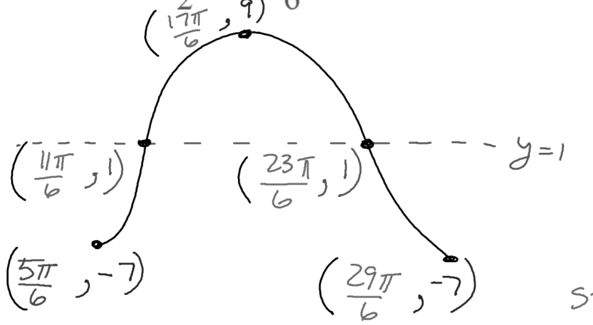
START AT $-\pi/4$ & Keep adding $\frac{\pi}{10}$ to get the next 4 x-coord

Graph one period of this function. Label the coordinates of all x-intercepts, Maximums, and Minimums.

$$y = -8\text{Cos}(\frac{1}{2}(x - \frac{5\pi}{6})) + 1$$

Graph one period of this function. Label the coordinates of all x-intercepts, Maximums, and Minimums.

$$y = -8\text{Cos}(\frac{1}{2}(x - \frac{5\pi}{6})) + 1$$



$\frac{5\pi}{6} + \pi = \frac{5\pi}{6} + \frac{6\pi}{6}$

Amp = 8

midline: $y = 1$

phase shift:

$\frac{5\pi}{6}$ RT

period $= \frac{2\pi}{1/2} = 4\pi$

$1/4$ period $= 1/4 \cdot 4\pi = \pi$

START A $\frac{5\pi}{6}$ and Keep adding π to get the next 4 x-coord.

You can now finish Hwk #11.

Practice Sheet Sec 13-7