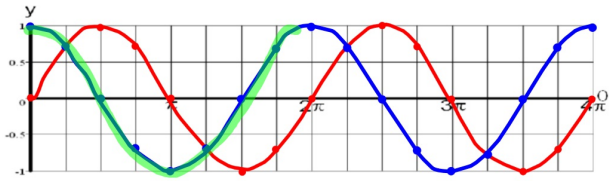
2. Fill out the table for Cos (round decimals to the nearest hundredth) and plot.

θ	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π	$\frac{5\pi}{4}$	$\frac{3\pi}{2}$	$\frac{7\pi}{4}$	2π	$\frac{9\pi}{4}$	$\frac{5\pi}{2}$	$\frac{11\pi}{4}$	3π	$\frac{13\pi}{4}$	$\frac{7\pi}{2}$	$\frac{15\pi}{4}$	4π
Cosθ	1	0.71	0	-0.71	-1	-0.71	0	0.71	1	0.71	0	-0.71	-1	-0.71	0	0.71	1



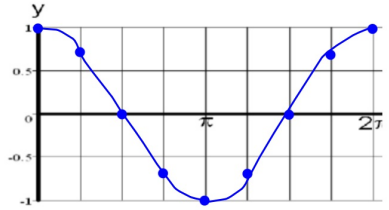
y = Cosθ

Period = 2π Amplitude = 1 Eq Midline: $y = 0$

These are all the same as for y=Sinx !

One cycle of the parent Sine function looks like a sideways "S".

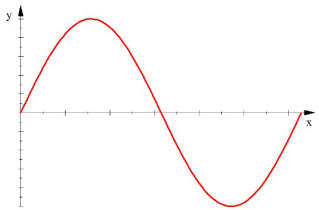
What does one period of the parent Cosine function look like?



The "first" period of a Cosine looks like a "U"-shape or similar to a parabola.

Where does Cosine "start"? Cosine "starts" at a MAXIMUM.

The Parent Function: y = Sinx

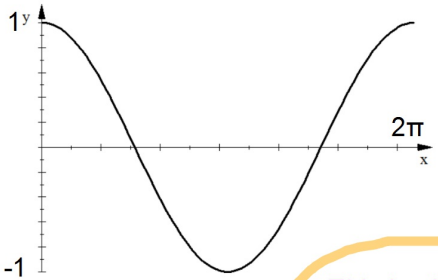


Period= 2π

Amplitude= 1

Eq of Midline: y = 0

The Parent Function: y = Cosx

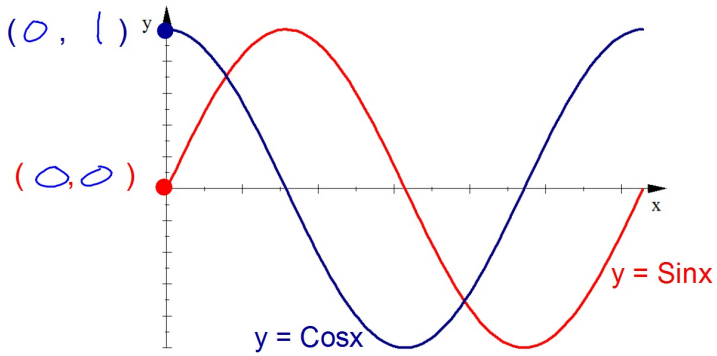


Period= 2π

Amplitude= 1

Eq of Midline: y = 0

This is all the SAME as Sine!!!



How are the graphs of Cosx and Sinx the SAME?

The have the same Period, Amplitude, and Midline.

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

How are the graphs of Cosx and Sinx DIFFERENT?

Where they start.

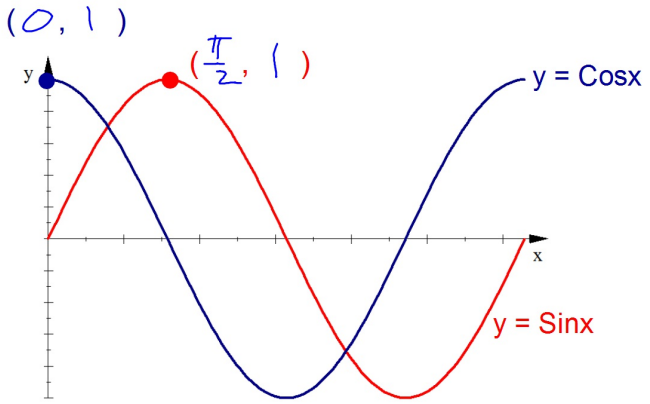
Starting points and direction for the Parent Functions.

y = Sinx
Starts on the midline then goes up.

y = Cosx
Starts at a maximum.

Starting points for y = aSin/Cosx

Sine Graphs		Cosine Graphs	
Positive **a**	Starts on the Midline and goes UP	Positive **a**	Starts at a Max
Negative **a**	Starts on the Midline and goes DOWN	Negative **a**	Starts at a Min



ALSO

How else is the graph of Cosx related to the graph of Sinx?

They are horizontal translations of each other.

To get the Sinx you translate Cosx 90° to the right
Sinx = Cos(x-90°)

To get the Cosx you translate Sinx 90° to the left
Cosx = Sin(x+90°)

y = asinbx

a = Amplitude (vertical Stretch or Shrink factor)

a<0 is an x-axis reflection (upside down)

$$\text{Period} = \frac{2\pi}{b} \longrightarrow b = \frac{2\pi}{\text{Period}}$$

y = acosbx

a = Amplitude (vertical Stretch or Shrink factor)

a<0 is an x-axis reflection (upside down)

$$\text{Period} = \frac{2\pi}{b} \longrightarrow b = \frac{2\pi}{\text{Period}}$$

This is all the same as Sine!!!

Graph one period of this Cosine Function. Label the coordinates of all maximums, minimums, and pts on the midline.

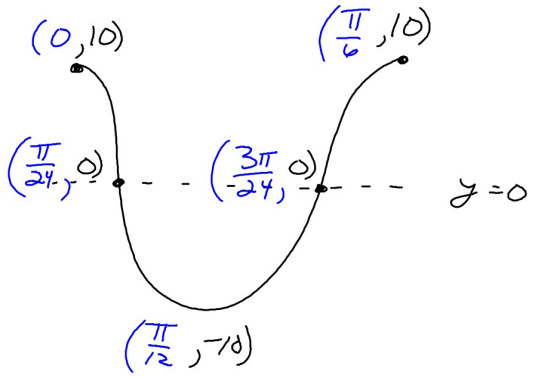
$y = 10 \cos 12x$

amplitude = 10

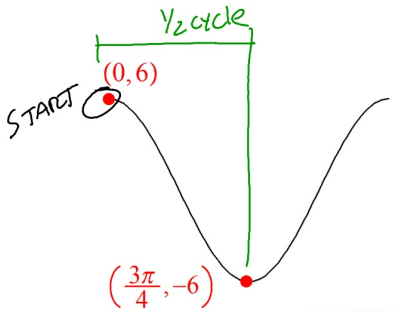
period = $\frac{2\pi}{12} = \frac{\pi}{6}$

midline: $y = 0$

STARTS AT A MAX



Write the equation of this Cosine Function.



EQ: $y = 6 \cos \frac{4x}{3}$

midline: $y = \frac{6+-6}{2} = 0$

$K = 0$

Amplitude = 6

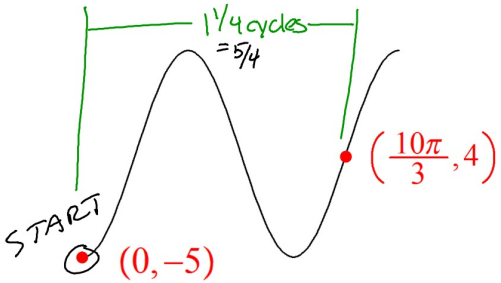
$a = 6$

period = $\frac{\frac{3\pi}{4}}{\frac{1}{2}} = \frac{3\pi}{4} \cdot 2 = \frac{3\pi}{2}$

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

$b = \frac{4}{3}$

Write the equation of this Cosine Function.



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

midline: $y = 4$

$K = 4$

Amplitude = 4 − −5 = 9

$a = -9$

period = $\frac{\frac{10\pi}{3}}{\frac{5}{4}} = \frac{10\pi}{3} \cdot \frac{4}{5} = \frac{8\pi}{3}$

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

$b = \frac{3}{4}$

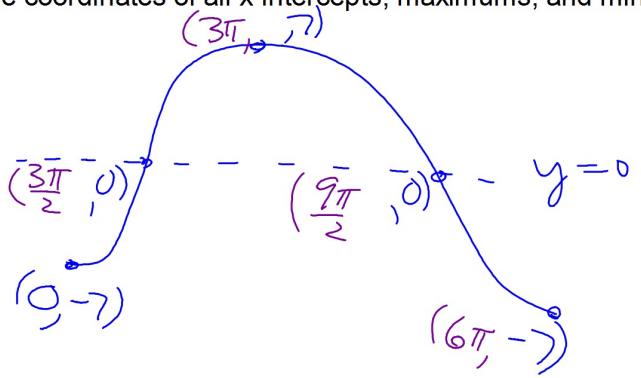
$b = \frac{2\pi}{\frac{8\pi}{3}} = 2\pi \cdot \frac{3}{8\pi}$

$= \frac{3}{4}$

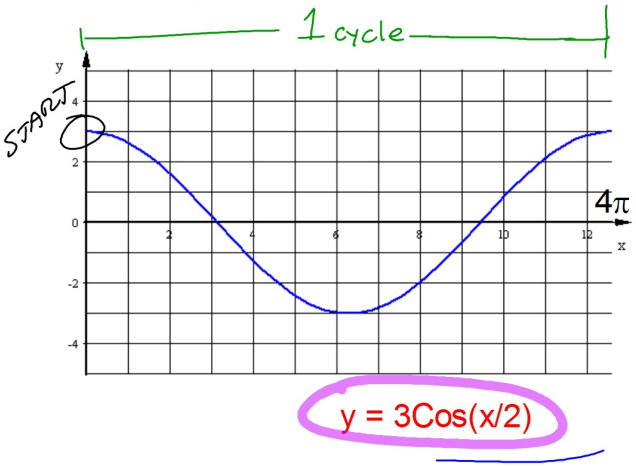
Graph one period of: $y = -7\cos(\frac{x}{3})$

period = $\frac{2\pi}{\frac{1}{3}} = 6\pi$

Label the coordinates of all x-intercepts, maximums, and minimums.



Write the equation of this Cosine Function.



midline: $y=0$

$k=0$

Amp = 3

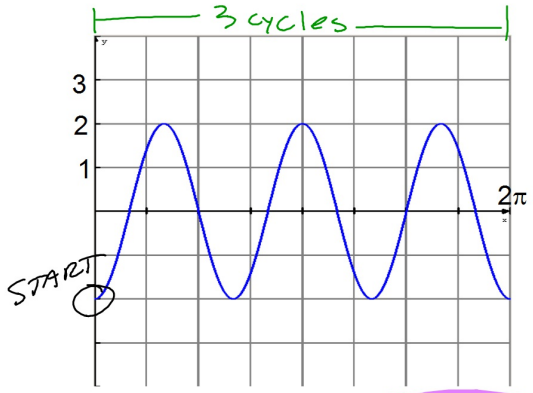
$a=3$

period = 4π

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

$y = 3\cos(x/2)$

Write the equation of this Cosine Function.



midline: $y=0$

$k=0$

Amplitude = 2

$a=-2$

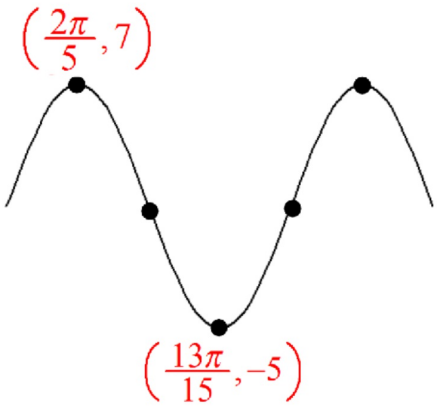
period = $\frac{2\pi}{3}$

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

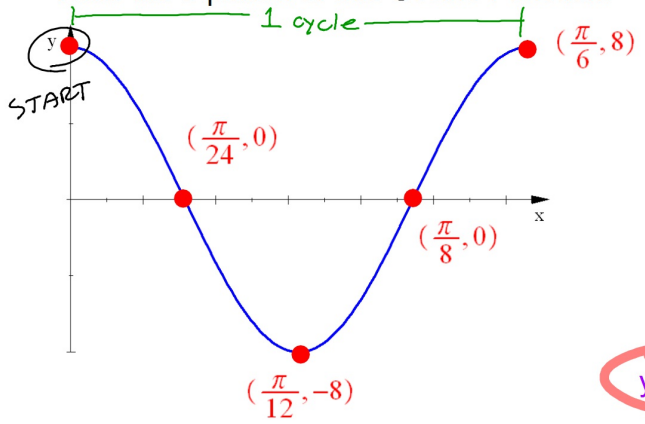
$b=3$

$y = -2\cos(3x)$

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



Write the equation of this Cosine Function:



midline: $y=0$

$k=0$

amplitude = 8

$a=8$

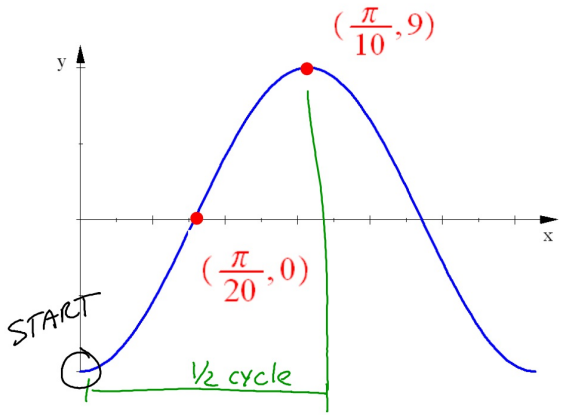
period = $\frac{\pi}{6}$

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

$b=12$

$y = 8\cos(12x)$

Write the equation of this Cosine Function:



Amp = 9

$a = -9$

midline: $y = 0$

$k = 0$

period = $\frac{\pi}{10} \cdot 2 = \frac{\pi}{5}$

$b = \frac{2\pi}{\frac{\pi}{5}} = 2\pi \cdot \frac{5}{\pi}$

$b = 10$

$y = -9\cos 10x$

You can now do Hwk #10

Sec 13-5

Practice Sheet