13.4/13.5 Graphing Sin and Cos Curves Day 2

Objective: To graph sin and cos curves using vertical and horizontal stretches

Definitions:

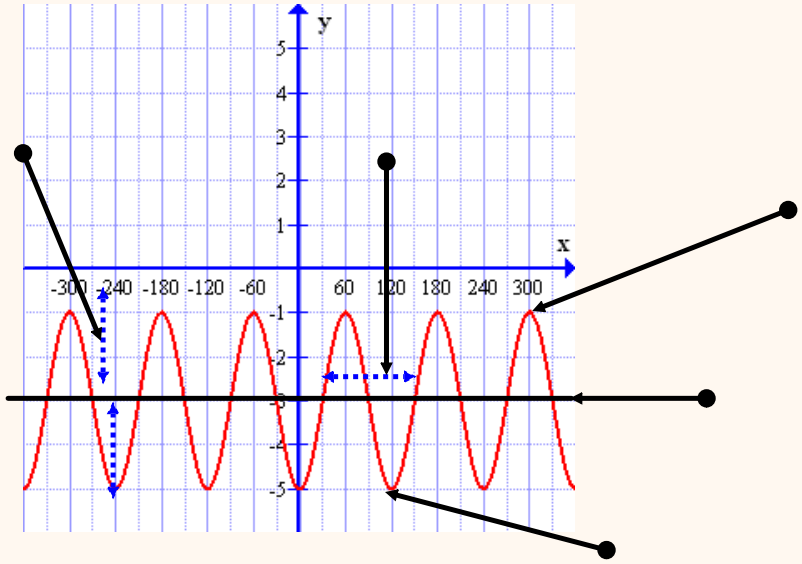
Cycles- the number of times a sine or cosine curve repeats over the interval $(0, 2\pi]$

Period - the length of one cycle

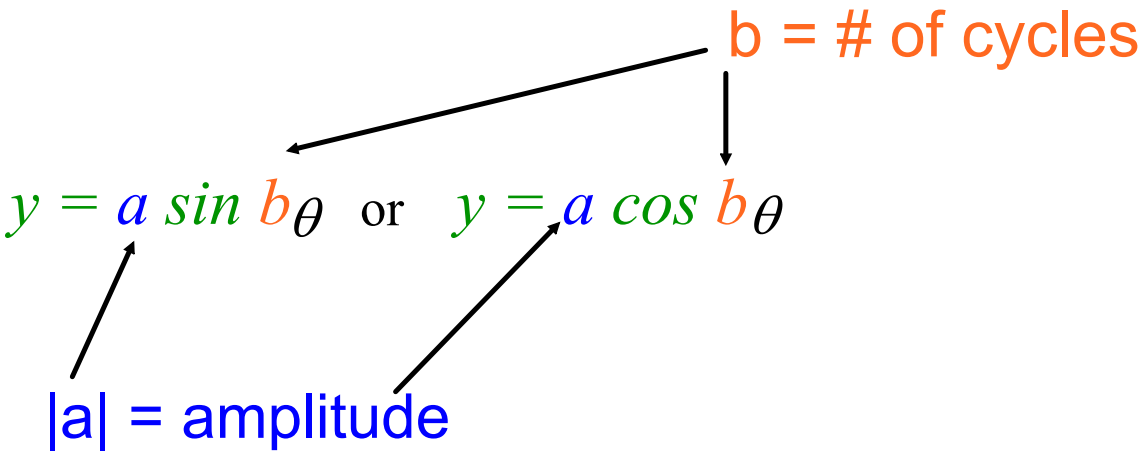
Midline - the horizontal axis that is half way between the maximum and minimum

Amplitude - the distance between the midline and the maximum / minimum

Sin and Cos Graphs and their characteristics



GENERAL RULE FOR GRAPHING



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

How many cycles does the function have from $[0, 2\pi)$?
What is the amplitude? period?

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

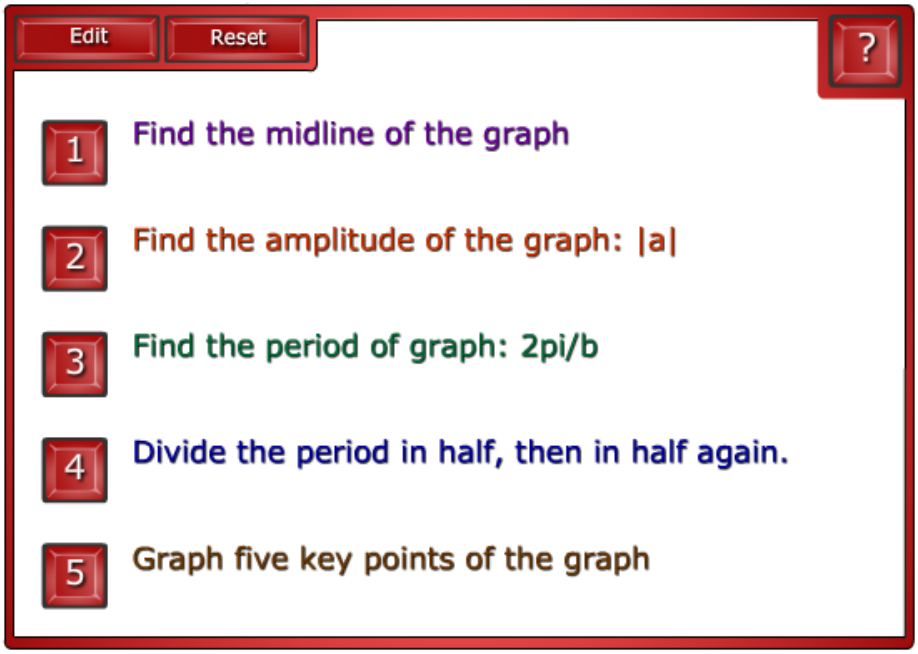
$y = 3\cos\theta$ $a = 3$ $b = 1$ per: 2π

$y = -\frac{1}{2}\sin 4\theta$ $a = -\frac{1}{2}$ $b = 4$ per: $\frac{\pi}{2}$

$y = \cos\frac{2}{3}\theta$ $a = 1$ $b = \frac{2}{3}$ per: 3π

$\frac{2\pi}{4}$ $\frac{2\pi}{2/3} = 2\pi \cdot \frac{3}{2}$

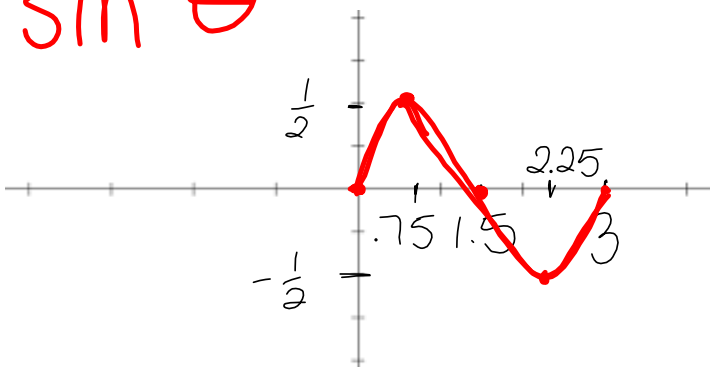
Steps for graphing sin and cos graphs



Sketch one cycle of each sine curve, then write an equation for the graph.

1) amplitude of 2, period of 2π

$y = 2\sin\theta$



2) amplitude of 1/2, period of 3

$y = \frac{1}{2}\sin\frac{2\pi}{3}\theta$

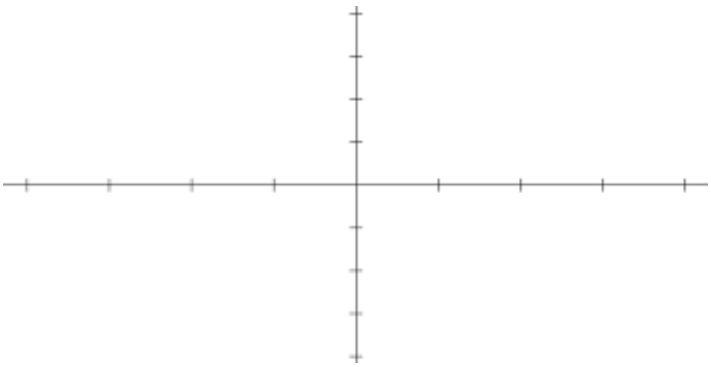
$\frac{2\pi}{b} = \frac{3}{1}$

$3b = 2\pi$

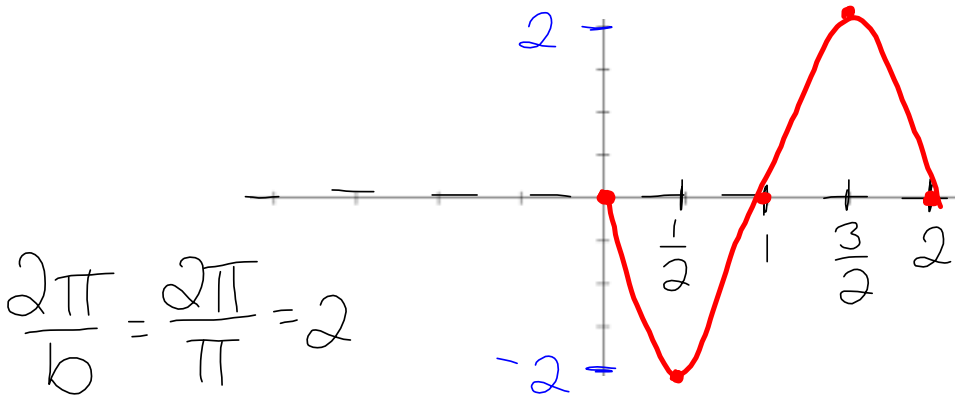
Sketch one cycle of each cosine curve, then write an equation for the graph.

3) amplitude of 1/2, period of π

4) a



Now let's graph $y = -2 \sin \pi\theta$

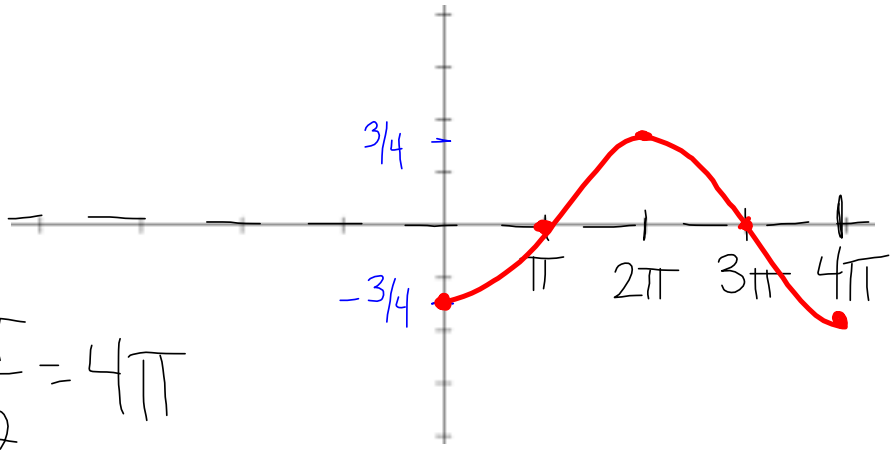


$\frac{2\pi}{b} = \frac{2\pi}{\pi} = 2$

Graph $y = -\frac{3}{4}\cos\frac{1}{2}\theta$

Amplitude:

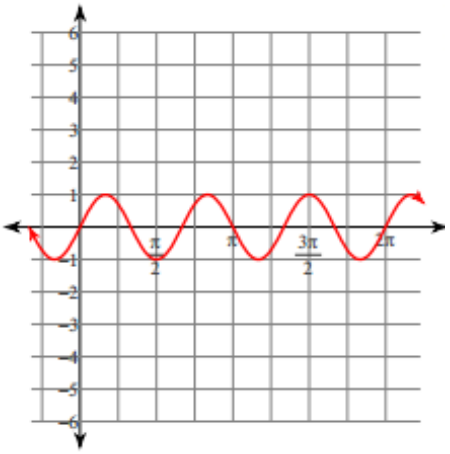
Period:



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

$2\pi \cdot \frac{2}{1}$

Given the sin graph, find the period and amplitude, then write the equation.

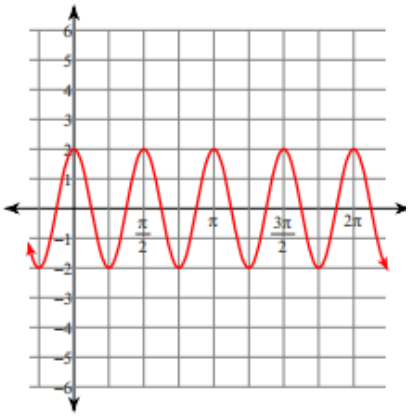


Amplitude: 1

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

$y = \sin 3\theta$

Given the cos graph, find the period and amplitude then write the equation.



Amplitude: 2

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

$y = 2\cos 4\theta$

HW 13.4/13.5

p. 738 #13-39 odd
p. 746 #5-15 odd, 41, 42, 45