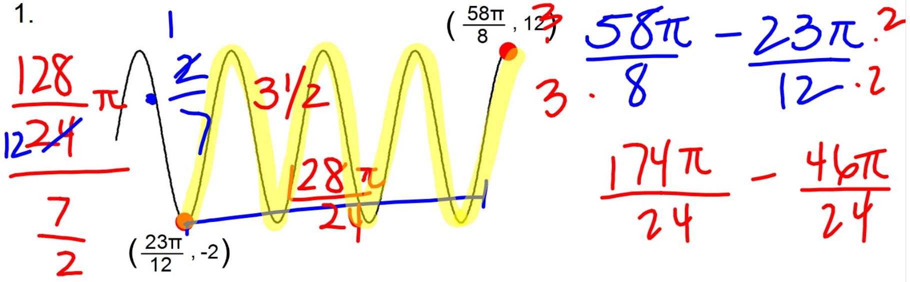
1.



$\frac{128}{12\cancel{24}}\pi$ $\frac{2}{7}$ $3\frac{1}{2}$ $\frac{7}{2}$ $\frac{128}{24}\pi$

$\frac{58\pi}{3 \cdot 8} - \frac{23\pi \cdot 2}{12 \cdot 2}$

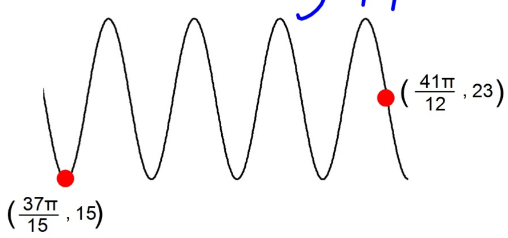
$\frac{174\pi}{24} - \frac{46\pi}{24}$

Amplitude = 7

Eq of Midline: $y = 5$

Period = $\frac{32\pi}{21}$

2.



$3\frac{3}{4}$

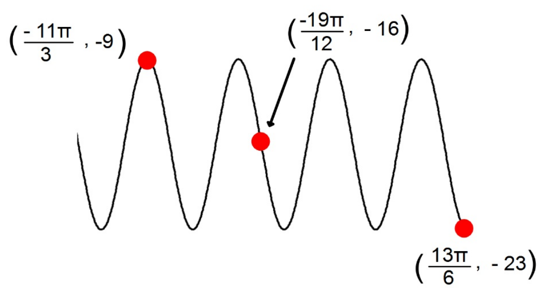
$\frac{\frac{57\pi}{60}}{\frac{15}{4}}$

Amplitude = 8

Eq of Midline: $y = 23$

Period = $\frac{19\pi}{75}$

3.

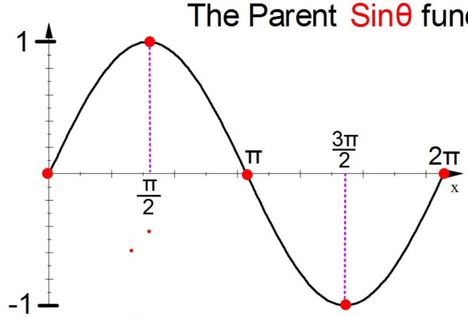


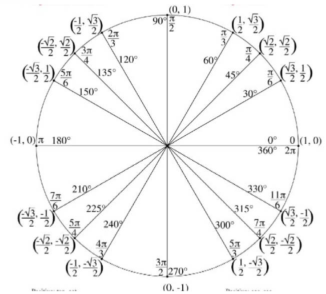
Amplitude = 7

Eq of Midline: $y = -16$

Period = $\frac{5\pi}{3}$

The Parent Sinθ function:





Period = 2π

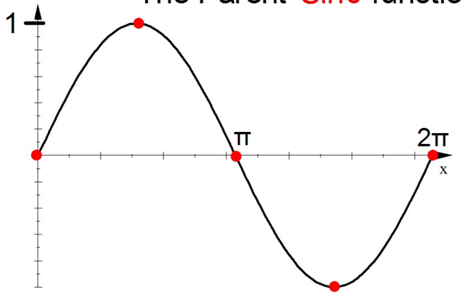
Amplitude = 1

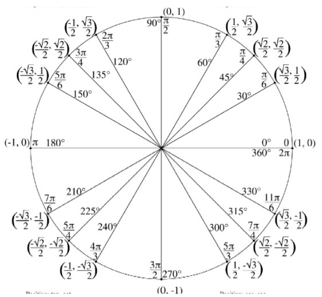
Eq of Midline: $y = 0$

Max = 1 when $x = \frac{\pi}{2}$

Min = -1 when $x = \frac{3\pi}{2}$

The Parent Sinθ function:





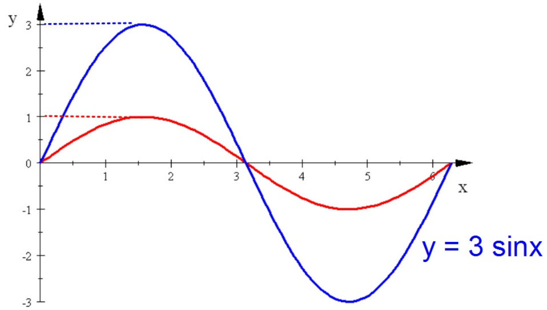
x-int at
o, π, 2π

y-int
0

Domain:
$(-\infty,\infty)$

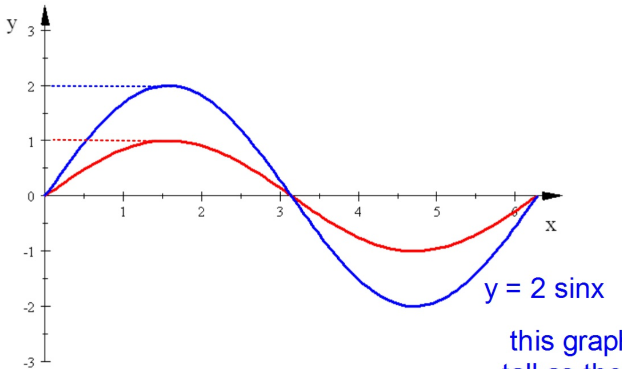
Range:
[-1,1]

Parent Function: y = sinx



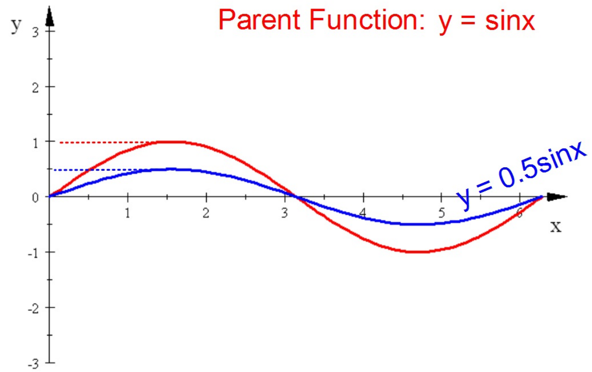
this graph is three times taller than the Parent Function

Parent Function: y = sinx



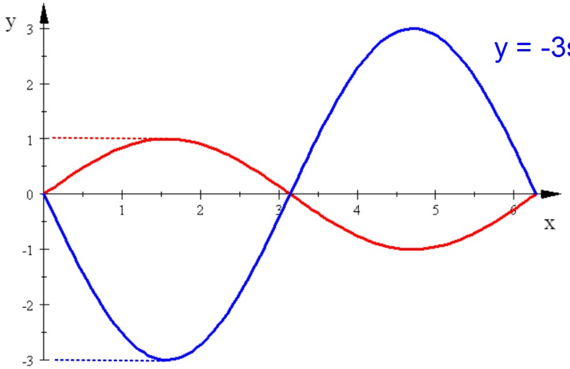
this graph is twice as tall as the Parent Function

Parent Function: y = sinx



this graph is half as tall as the Parent Function

Parent Function: y = sinx



y = -3sinx

this graph is three times taller than the Parent Function and Upside Down.

y = asinx

a = Amplitude (Vertical Stretch Factor)

Can you have a negative Amplitude?

No, since amplitude is a distance, it can't be negative.

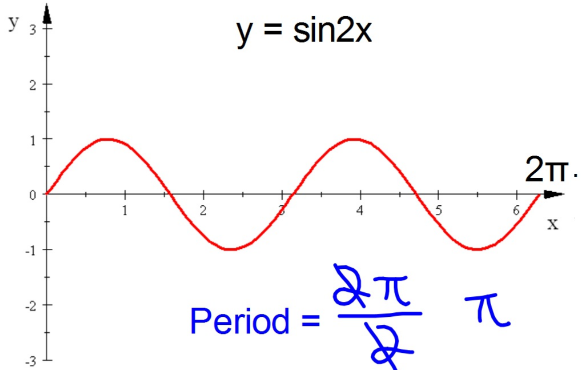
If a<0 then there is an x-axis reflection.
Upside down

Now Do Part 2 of the Exploration.

Remember:

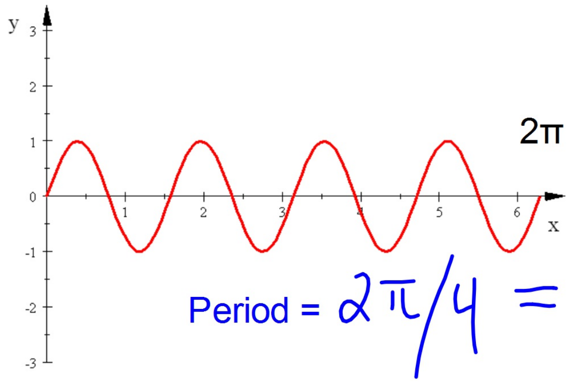
$$\text{Period} = \frac{\text{distance between two points}}{\text{\# cycles between those two points}}$$

y = sin2x



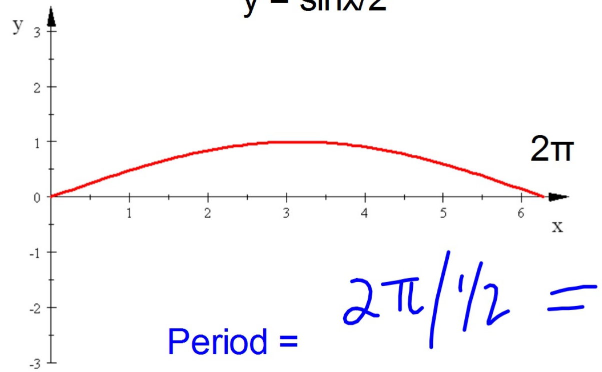
Period = $\frac{\cancel{2}\pi}{\cancel{2}}$ π

y = Sin4x



Period = $2\pi/4 = \pi/2$

y = sinx/2



Period = $2\pi/\tfrac{1}{2} = 4\pi$

sinbx	Period
$\sin x$	2π
$\sin 2x$	$\frac{2\pi}{2} = \pi$
$\sin 4x$	$\frac{2\pi}{4} = \frac{\pi}{2}$
$\sin \frac{x}{2}$	$\frac{2\pi}{\frac{1}{2}} = 4\pi$

y = sinbx

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

amp. = $|a|$

Find the amplitude and period for each Sine Function:

1. $y = 7\sin 5x$

Amplitude= $a = 7$

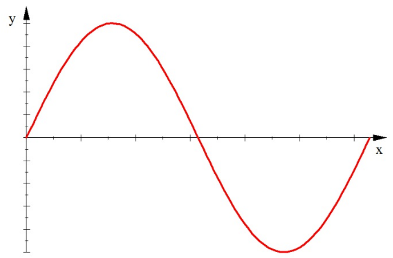
Period= $\frac{2\pi}{5}$

2. $y = -4\sin\frac{x}{3}$

Amplitude= $a = 4$

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

The Parent Function: y = Sinx



Period= 2π

Amplitude= 1

Eq of Midline: $y = 0$

y = asinbx

a = Amplitude

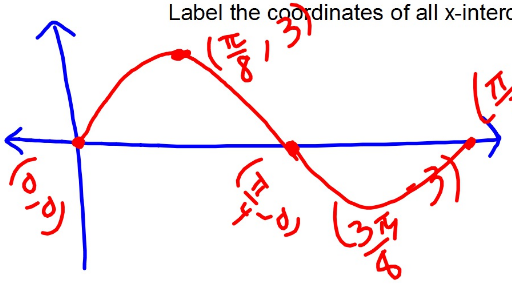
a<0 is an x-axis reflection (upside down)

b: ⟶ Period = $\frac{2\pi}{b}$

Sketch one period of the graph of

$y=3\sin 4x$

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



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

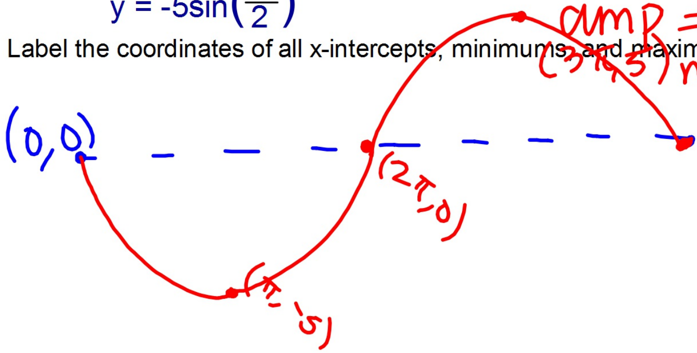
midline $= y = 0$

amp $= 3$

Sketch one period of the graph of

$y = -5\sin\left(\frac{x}{2}\right)$

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



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

amp $= 5$

mid $y=0$

reflect x-axis

Using y = asinbx

1. To find find the value of a on a given graph all you need to know is the amplitude.

2. If the cycle in your graph starts on the midline and goes up to a maximum a is Positive

3. If the cycle in your graph starts on the midline and goes down to a minimum a is Negative

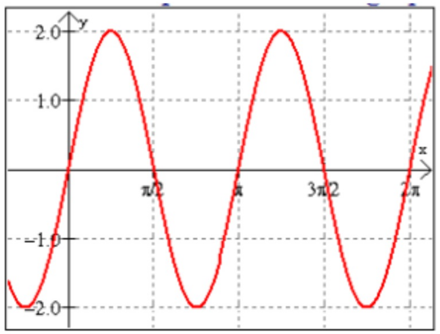
Using y = asinbx

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

Solving for b you get: b= $\frac{2\pi}{\text{Period}}$

Therefore, to find the value of b given a graph all you need to know is the period.

Write the equation of this sine function. y = asinbx

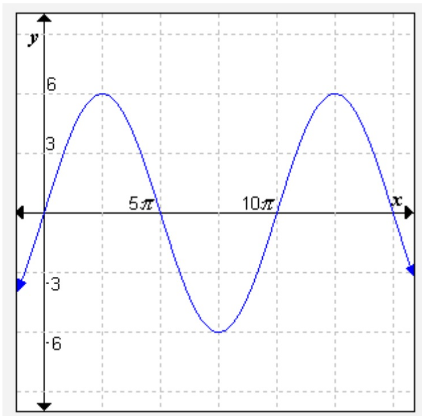


$y = 2\sin x$

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

b= $\frac{2\pi}{\text{Period}}$ $\frac{2\pi}{2\pi}$ 1

Write the equation of this sine function. y = asinbx

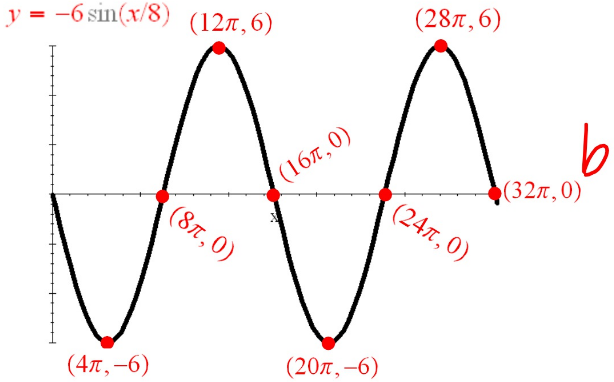


$a = 6$

$b = \frac{2\pi}{10\pi} = \frac{1}{5}$

$y = 6\sin(\frac{1x}{5})$

Write the equation of this sine function. $y = a\sin bx$

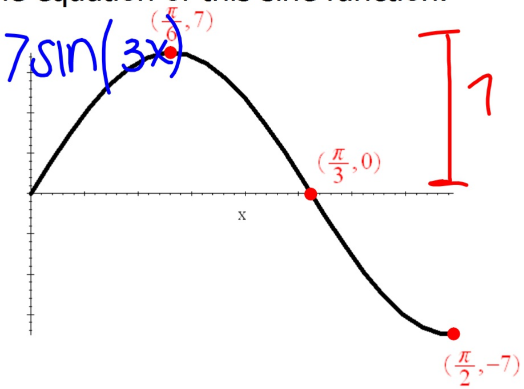


$a = 6$

$b = \frac{2\pi}{16\pi} = \frac{1}{8}$

Write the equation of this sine function. $y = a\sin bx$

$y = 7\sin(3x)$



7

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

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

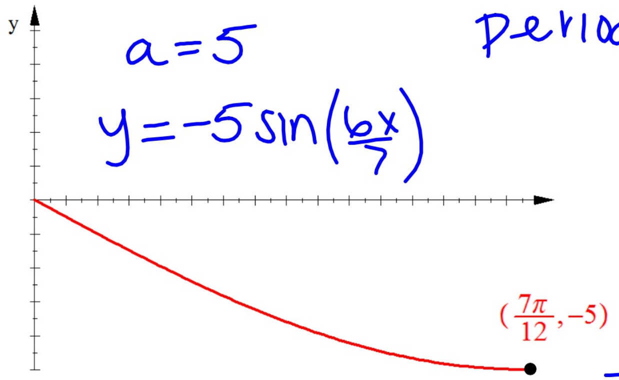
$= \frac{2\pi}{\frac{2\pi}{3}} = 3$

$a =$

Write the equation of this sine function. $y = a\sin bx$

$a = 5$

$y = -5\sin\left(\frac{6x}{7}\right)$

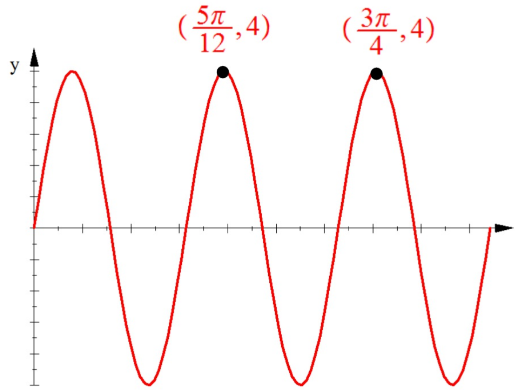


$\text{period} = \frac{7\pi}{3\cancel{12}} \cdot \frac{\cancel{4}}{1}$
$ \frac{}{1/4}$

$= \frac{7\pi}{3}$

$= \frac{2\pi}{\frac{7\pi}{3}} = \frac{6}{7}$

Write the equation of this sine function. $y = a\sin bx$



You can now finish Hwk #21 Sec 13-4

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Problems 13, 14, $\boxed{22, 23, 27}$, 31, 32, 42

for #'s 22, 23, 27 label the coordinates of ALL Max's, Min's, and x-int