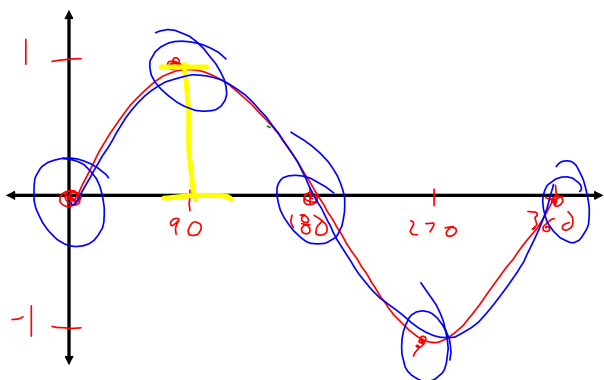
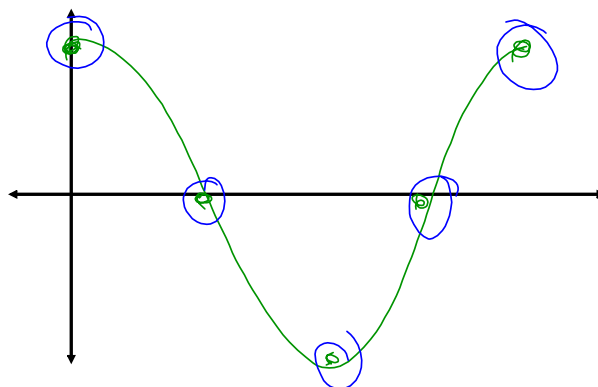


Graphs of Trig Functions

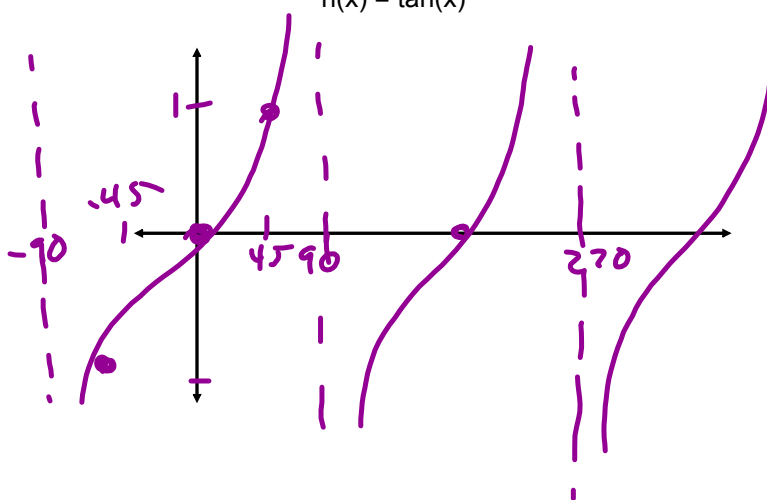
$f(x) = \sin(x)$



$g(x) = \cos(x)$



$h(x) = \tan(x)$



Transformations of Trig Functions

$$y = a f [k (x - d)] + c$$

if $|a| > 1$
 V. Stretch

if $|a| < 1$
 V. Compression

if $a < 0$
 -reflection in
 x-axis

if $|k| > 1$
 H. Compress

if $|k| < 1$
 H. Stretch

if $k < 0$
 reflection
 in y-axis

• shift
 left
 $(x + d)$

• right
 $(x - d)$

• up
 $(+c)$

• down
 $(-c)$

$$y = a \sin[k(x - d)] + c$$

	Sin(x)	Cos(x)	Tan(x)
Period	360°	360°	180
Amplitude	1	1	∞
Midline	$y = 0$	$y = 0$	X

Factor	Value	Effect
a	$a > 1$	
	$0 < a < 1$	
	$-1 < a < 0$	
	$a < -1$	
k	$k > 0$	
	$0 < k < 1$	
	$-1 < k < 0$	
	$k < -1$	
d	$d > 0$	
	$d < 0$	
c	$c > 0$	
	$c < 0$	

For Sine and Cosine Functions

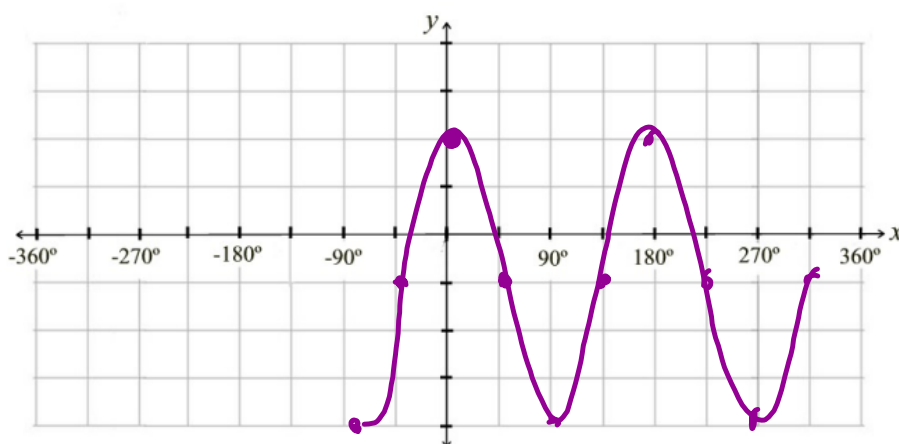
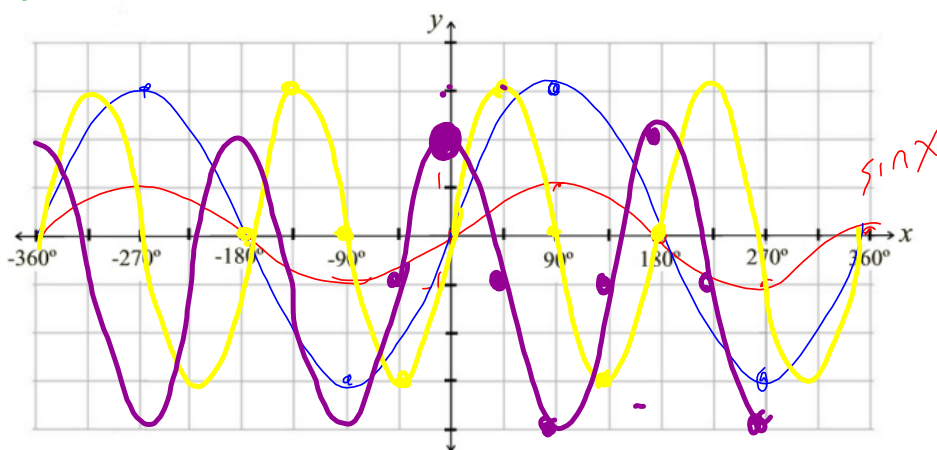
Amplitude

Period

Midline

Sketch the graph of $f(x) = \underline{3} \sin(\underline{2}(x + \underline{45})) - \underline{1}$

1. Vertical Stretch of 3 ✓
2. Horizontal Compression of 2. ✓
3. Left 45°
4. Down 1



Sketch the graph of $f(x) = 3 \sin(2(x + 45)) - 1$

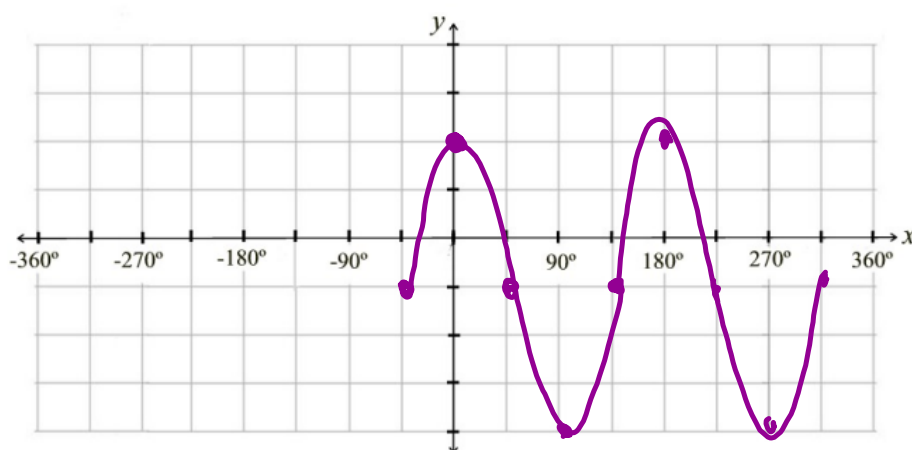
$$(x, y) \rightarrow \left(\frac{x}{k} - d, ay + c \right)$$

$$\sin(x) \rightarrow \left(\frac{x}{2} - 45, 3y - 1 \right)$$

x	y
0	0
90	1
180	0
270	-1
360	0



x	y
-45	-1
0	2
45	-1
90	-4
135	-1



Determine a Sin and Cos equation for the following graph:

Midline

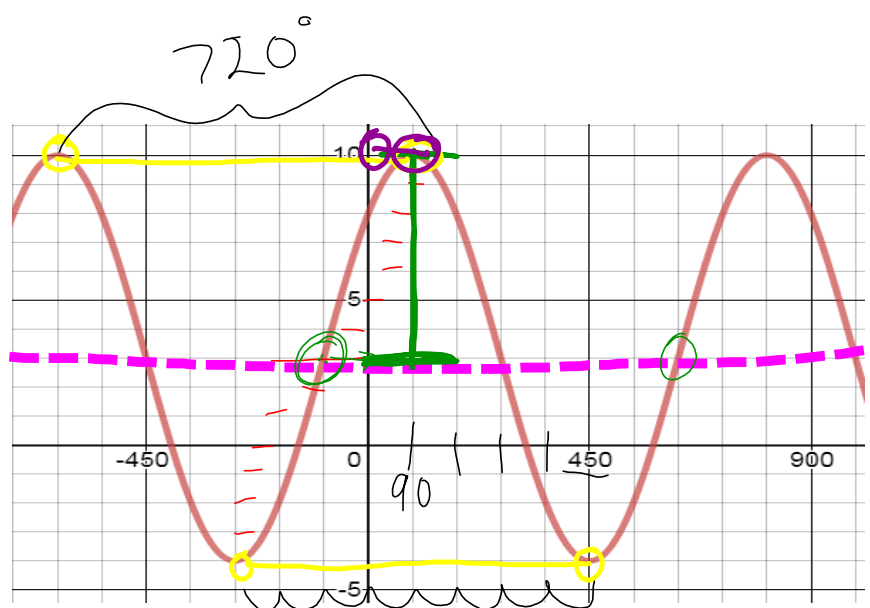
$$\frac{10 + (-4)}{2} = 3$$

Amplitude

$$\frac{10 - (-4)}{2} = 7$$

Period

$$720^\circ$$



$$y = a \sin[k(x - d)] + c$$

$$y = 7 \sin\left(\frac{1}{2}(x + 90)\right) + 3$$

what about Cosine

$$y = 7 \cos\left(\frac{1}{2}(x - 90)\right) + 3$$

$$y = 7 \cos\left(\frac{1}{2}(x + 630)\right) + 3$$

$$y = -7 \sin\left(\frac{1}{2}(x + 450)\right) + 3$$

Amplitude \rightarrow "a"

Mid line \rightarrow "c"

Period \rightarrow "k" $\text{period} = \frac{360}{k}$
 $k = \frac{360}{\text{period}}$

if $k=1 \rightarrow \text{period} = 360$

if $k=2 \rightarrow \text{"} = 180$

if $k = \frac{1}{2} \rightarrow \text{"} = 720$

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