

§4.5: Graphs of Sin, Cos, and Tan
“I WILL...
...graph trig functions.”

I. Graphing Trig Functions

A. From the Unit Circle, there are five points to graph.

1. Sine and Cosine graphs, they are _____, _____, _____, _____, and _____

2. Tan graph points are at _____, _____, _____, _____, and _____

B. In labeling the graph, there will be five points on the x -axis to list on marks using the Quadrantals.

C. Period is of a function is the horizontal length of one complete cycle.

D. Cosine and Sine graphs

1. Sine and Tangent graphs are an _____ function (reflects over the origin)

2. Cosine Graph is an _____ function (symmetrical of the y -axis)

<p>Ex 1: Graph $y = \sin x$ from $[0, 2\pi]$</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 10%;">x</td> <td style="width: 15%;">0</td> <td style="width: 15%;">$\frac{\pi}{2}$</td> <td style="width: 15%;">π</td> <td style="width: 15%;">$\frac{3\pi}{2}$</td> <td style="width: 15%;">2π</td> </tr> <tr> <td>$f(x)$</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="3">Period:</td> <td colspan="3">Decreasing:</td> </tr> <tr> <td colspan="3">Domain:</td> <td colspan="3">Zeroes:</td> </tr> <tr> <td colspan="3">Range:</td> <td colspan="3">Odd/Even</td> </tr> <tr> <td colspan="3">Increasing:</td> <td colspan="3"></td> </tr> </table>	x	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π	$f(x)$						Period:			Decreasing:			Domain:			Zeroes:			Range:			Odd/Even			Increasing:						<p>Ex 2: Graph $y = \cos x$ from $[0, 2\pi]$</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 10%;">x</td> <td style="width: 15%;">0</td> <td style="width: 15%;">$\frac{\pi}{2}$</td> <td style="width: 15%;">π</td> <td style="width: 15%;">$\frac{3\pi}{2}$</td> <td style="width: 15%;">2π</td> </tr> <tr> <td>$f(x)$</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="3">Period:</td> <td colspan="3">Decreasing:</td> </tr> <tr> <td colspan="3">Domain:</td> <td colspan="3">Zeroes:</td> </tr> <tr> <td colspan="3">Range:</td> <td colspan="3">Odd/Even</td> </tr> <tr> <td colspan="3">Increasing:</td> <td colspan="3"></td> </tr> </table>	x	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π	$f(x)$						Period:			Decreasing:			Domain:			Zeroes:			Range:			Odd/Even			Increasing:					
x	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π																																																																				
$f(x)$																																																																									
Period:			Decreasing:																																																																						
Domain:			Zeroes:																																																																						
Range:			Odd/Even																																																																						
Increasing:																																																																									
x	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π																																																																				
$f(x)$																																																																									
Period:			Decreasing:																																																																						
Domain:			Zeroes:																																																																						
Range:			Odd/Even																																																																						
Increasing:																																																																									
<p>Ex 3: Graph $y = \tan(x)$ from $[-\frac{\pi}{2}, \frac{\pi}{2}]$</p>	<table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 10%;">x</td> <td style="width: 15%;">$-\frac{\pi}{2}$</td> <td style="width: 15%;">$-\frac{\pi}{4}$</td> <td style="width: 15%;">0</td> <td style="width: 15%;">$\frac{\pi}{4}$</td> <td style="width: 15%;">$\frac{\pi}{2}$</td> </tr> <tr> <td>$f(x)$</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="3">Period:</td> <td colspan="3">Decreasing:</td> </tr> <tr> <td colspan="3">Domain:</td> <td colspan="3">Zeroes:</td> </tr> <tr> <td colspan="3">Range:</td> <td colspan="3">Odd/Even</td> </tr> </table>	x	$-\frac{\pi}{2}$	$-\frac{\pi}{4}$	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$f(x)$						Period:			Decreasing:			Domain:			Zeroes:			Range:			Odd/Even																																												
x	$-\frac{\pi}{2}$	$-\frac{\pi}{4}$	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$																																																																				
$f(x)$																																																																									
Period:			Decreasing:																																																																						
Domain:			Zeroes:																																																																						
Range:			Odd/Even																																																																						
<p>Ex 4: Find t for $\sin t = \frac{\sqrt{2}}{2}$ from $[0, 2\pi)$</p>	<p>Your Turn: Find t for $\cos t = -\frac{\sqrt{3}}{2}$ from $[0, \pi)$</p>																																																																								

II. Transformations

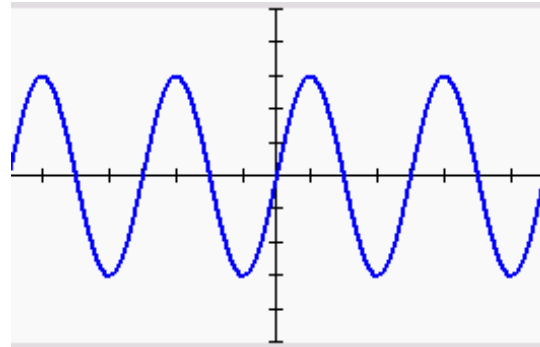
- A. Equation: $y = \underline{\hspace{1cm}}$ trig function $\underline{\hspace{1cm}}$
- B. $|A|$ is the $\underline{\hspace{1cm}}$
- C. B is the $\underline{\hspace{1cm}}$ or frequency
1. *Period equation*: $\underline{\hspace{1cm}}$ for sine and cosine
 2. *Period equation* = $\underline{\hspace{1cm}}$ for tan
- D. c is the $\underline{\hspace{1cm}}$ shift
- E. d is the $\underline{\hspace{1cm}}$ shift or phase shift

Ex 5: Identify the period and amplitude of $y = 5 \sin 2x$

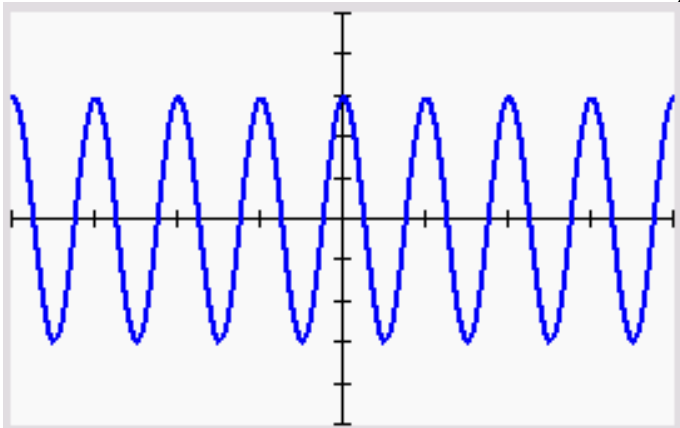
Ex 6: Identify the period and amplitude of $y = 2 \tan 2x + 1$

Your Turn: Identify the amplitude and period of $y = -3 \cos 4x + 2$

Ex 7: Use the graph below to determine the sine equation. Range is $[-2\pi, 2\pi]$ and each x -axis is by $\frac{\pi}{2}$



Ex 8: Use the graph below to determine the cosine equation. Range is $[-2\pi, 2\pi]$ and each x -axis is by $\frac{\pi}{2}$



Your Turn: Use the graph below to determine the sine equation. Range is $[-2\pi, 2\pi]$ and each x -axis is by $\frac{\pi}{2}$

