

# U6D2\_T\_Graphing Trig Functions

Tuesday, April 30, 2019 7:16 PM



U6D2\_T\_Graphing Tri...

<https://www.desmos.com/calculator/r0nvef9x3b>

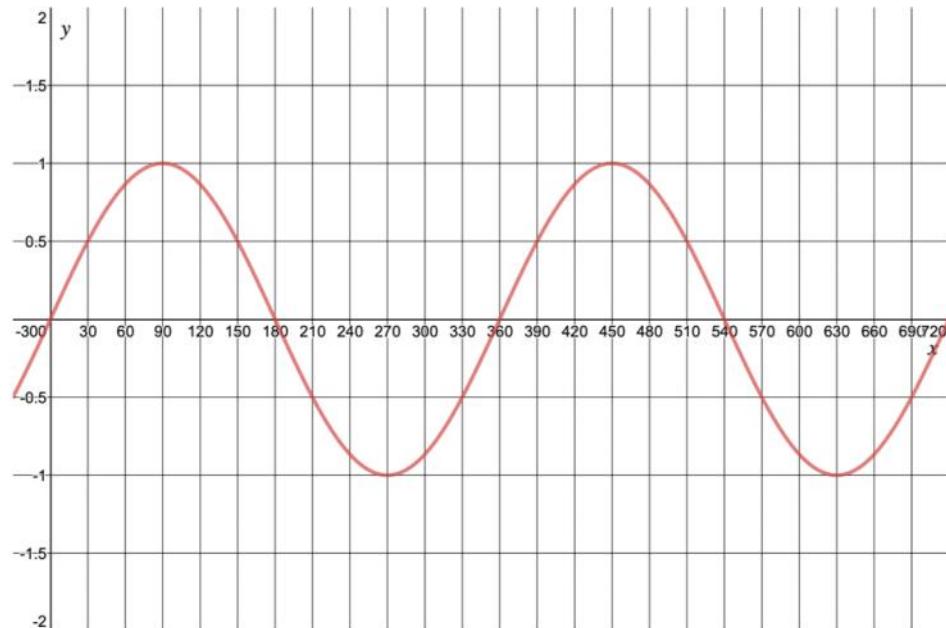
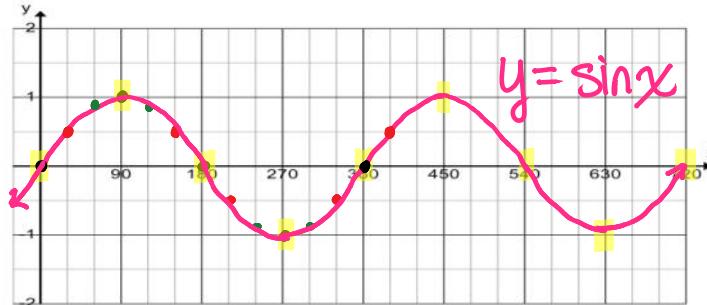
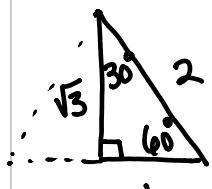
## U6D2 MCR 3UI Graphing Trigonometric Functions Using Degrees

Use DESMOS, your calculator, and knowledge of special angles to complete the table of values and graph each function.



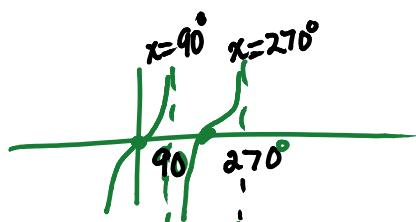
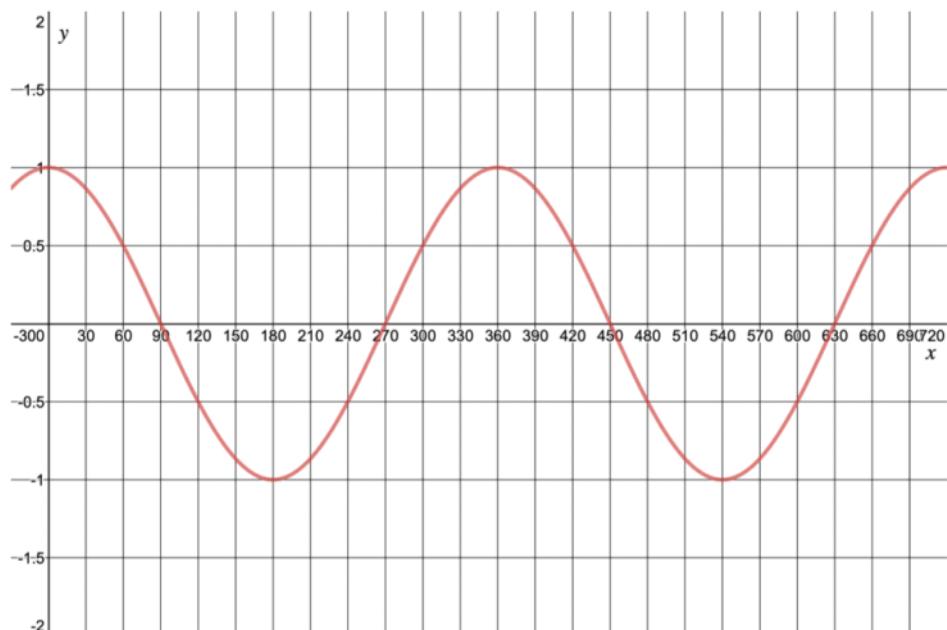
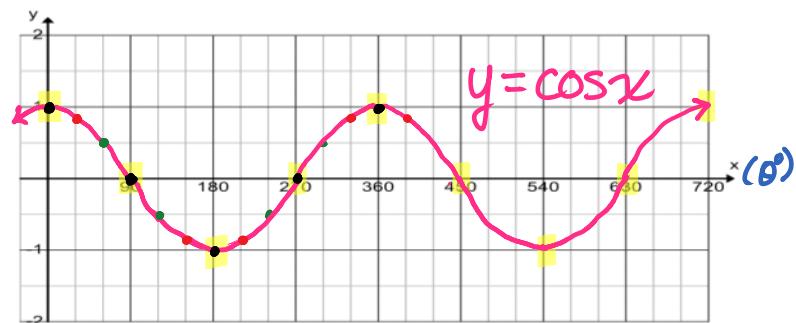
**Graph of  $y = \sin x$**

x	0	30	60	90	120	150	180	210	240	270	300	330	360	390
$\sin x$ exact	0	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	0	$\frac{1}{2}$
$\sin x$ approx.	0	0.5	0.9	1	0.9	0.5	0	-0.5	-0.9	-1	-0.9	-0.5	0	0.5



### Graph of $y = \cos x$

$x$	0	30	60	90	120	150	180	210	240	270	300	330	360	390
$\cos x$ exact	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$
$\cos x$ approx.	1	0.9	0.5	0	-0.5	-0.9	-1	-0.9	-0.5	0	0.5	0.9	1	0.9



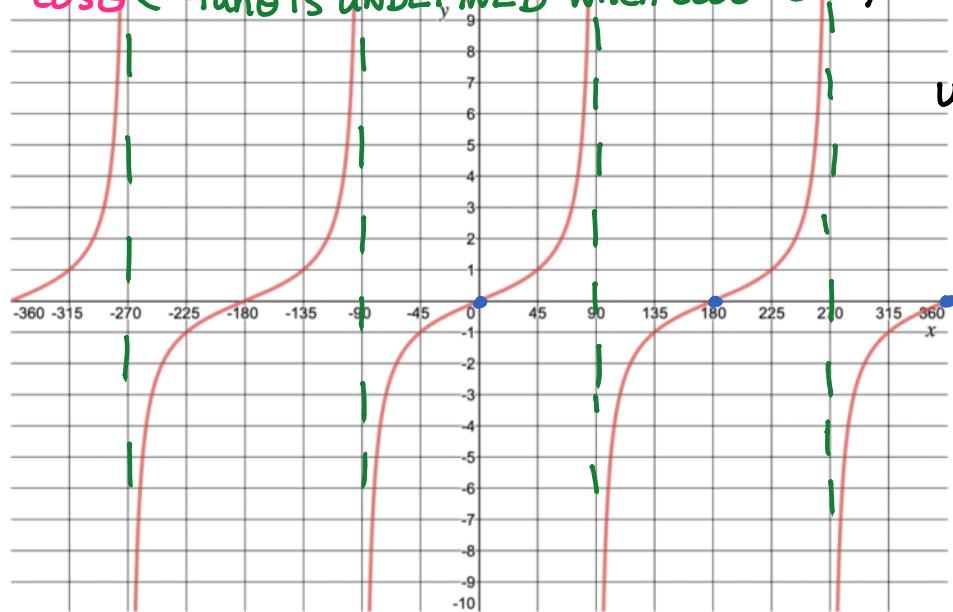
For fun, use DESMOS to graph  $y = \tan x$ . Is it periodic? If so, what is the period? amplitude?

$$\tan \theta = \frac{\sin \theta}{\cos \theta} \leftarrow \tan \theta = 0 \text{ when } \sin \theta = 0$$

$\leftarrow \tan \theta \text{ is UNDEFINED when } \cos \theta = 0$

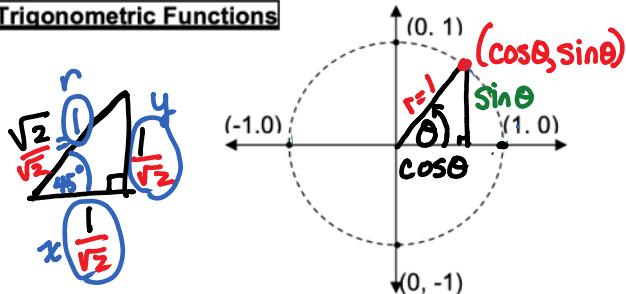
Yes  $180^\circ$

undefined



### Summarizing the Properties of Trigonometric Functions

Also called circular functions, trigonometric (trig) functions are based on angles. They are more specifically used to relate the angles of a triangle to the lengths of sides of a triangle.



Characteristics	$f(\theta) = \sin \theta$	$f(\theta) = \cos \theta$
Description	As a terminal arm rotates $\theta^\circ$ about a circle with radius 1, $f(\theta) = \sin \theta$ represents the <b>vertical</b> length (rise) of the triangle created from any point on the circle.	As a terminal arm rotates $\theta^\circ$ about a circle with radius 1, $f(\theta) = \cos \theta$ represents the <b>horizontal</b> length (run) of the triangle created from any point on the circle.
Period	$360^\circ$	$360^\circ$
Amplitude	$\frac{\max - \min}{2}$	1
Maximum Value	1	1
Minimum Value	-1	-1
Equation of the Axis	$y = \frac{\max + \min}{2}$	$y = 0$
Domain Angles	$\{ \theta   \theta \in \mathbb{R} \}$	$\{ \theta   \theta \in \mathbb{R} \}$
Range	$\{ y   y \in \mathbb{R}, -1 \leq y \leq 1 \}$	$\{ y   y \in \mathbb{R}, -1 \leq y \leq 1 \}$
Interval(s) of Increase For First Cycle	$0^\circ < \theta < 90^\circ, 270^\circ < \theta < 360^\circ$	$180^\circ < \theta < 360^\circ$
Interval(s) of Decrease First Cycle	$90^\circ < \theta < 270^\circ$	$0^\circ < \theta < 180^\circ$
5 key points $(\theta^\circ, y)$	$(0, 0), (180, 0), (360, 0), (90, 1), (270, -1)$	$(0, 1), (180, -1), (360, 1), (90, 0), (270, 0)$
Sketch one cycle of Graph		

**Notes:**

The sine function and cosine function are \_\_\_\_\_ sinusoidal curves (same shape and size, just a different orientation)

The cosine curve is the sine curve translated \_\_\_\_\_ ° to the left or \_\_\_\_\_ ° to the right.



