

Objective: To construct the parent graphs of trigonometric functions for sine, cosine, and tangent using exact values.

Complete the following table for $\sin \theta$. Find the values of $\sin \theta$ for each angle.

θ (degree) x	0° 0π	30°	45°	60°	90° $\pi/2$	120°	135°	150°	180° π
$\sin \theta$ (nearest tenth), y	0/1 0	1/2 .5	$\sqrt{2}/2$.71	$\sqrt{3}/2$.87	1/1 1	$\sqrt{3}/2$.87	$\sqrt{2}/2$.71	1/2 .5	0/1 0

θ (degree) x	210°	225°	240°	270° $3\pi/2$	300°	315°	330°	360° 2π	390°
$\sin \theta$ (nearest tenth), y	-1/2 -.5	$-\sqrt{2}/2$ -.71	$-\sqrt{3}/2$ -.87	-1/1 -1	$-\sqrt{3}/2$ -.87	$-\sqrt{2}/2$ -.71	-1/2 -.5	0/1 0	1/2 .5

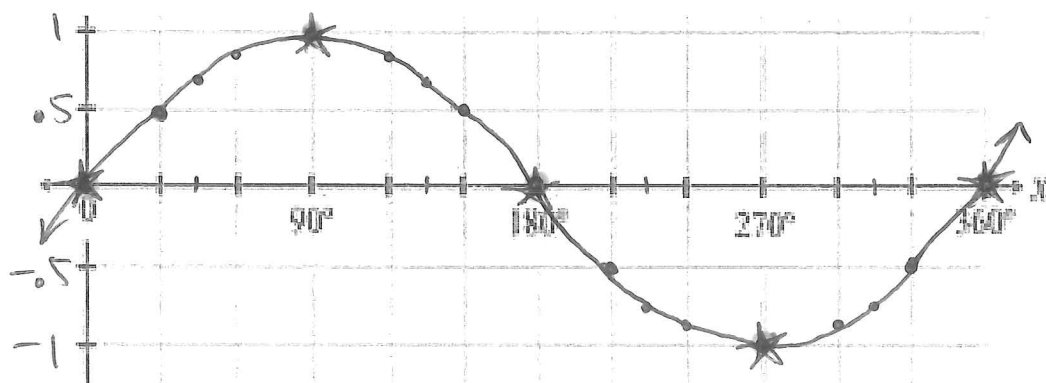
To graph the function $y = \sin \theta$, use values of θ expressed in either degrees or radians. These values represent the x values on a graph. Use the values of $\sin \theta$ expressed as a value rounded to the nearest tenth to represent the y values on the graph.

Ordered pairs for points on these graphs are of the form $(\theta, \sin \theta)$.

- $(0, 0)$
- $(30, .5)$
- $(45, .71)$
- $(60, .87)$
- \vdots

On the graph below, plot the points, $(\theta, \sin \theta)$. Connect the points with a smooth curve. This graph represents the graph of the sine function.

$y = \sin \theta$



Complete the following table for $\cos \theta$. Find the values of $\cos \theta$ for each angle.

θ (degree) x	0°	30°	45°	60°	90°	120°	135°	150°	180°
$\cos \theta$ (nearest tenth), y	1/1 1	$\sqrt{3}/2$.87	$\sqrt{2}/2$.71	1/2 .5	0/1 0	-1/2 -.5	$-\sqrt{2}/2$ -.71	$-\sqrt{3}/2$ -.87	-1/1 -1

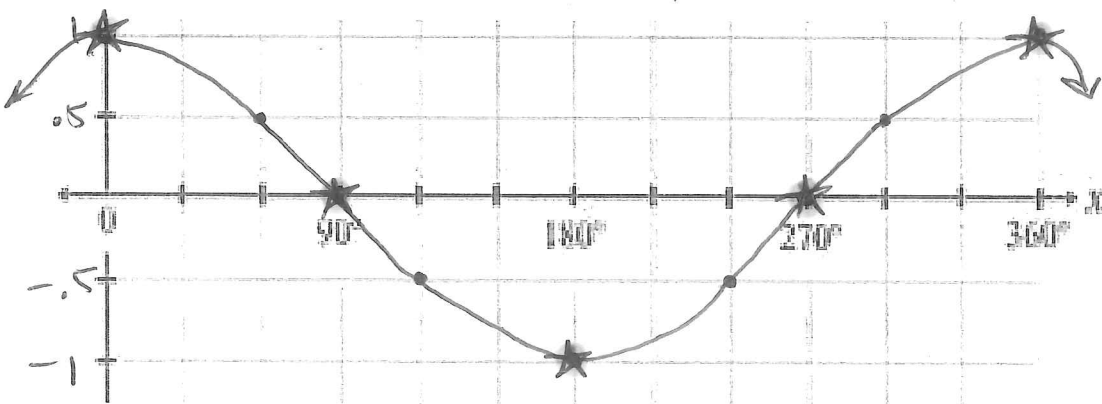
θ (degree) x	210°	225°	240°	270°	300°	315°	330°	360°	390°
$\cos \theta$ (nearest tenth), y	$-\sqrt{3}/2$ -.87	$-\sqrt{2}/2$ -.71	-1/2 -.5	0/1 0	1/2 .5	$\sqrt{2}/2$.71	$\sqrt{3}/2$.87	1/1 1	$\sqrt{3}/2$.87

To graph the function $y = \cos \theta$, use values of θ expressed in either degrees or radians. These values represent the x values on a graph. Use the values of $\cos \theta$ expressed as a value rounded to the nearest tenth to represent the y values on the graph.

Ordered pairs for points on these graphs are of the form $(\theta, \cos \theta)$.
 (0, 1) (60, .5)
 (30, .87) (90, 0)
 (45, .71) (120, -.5)

On the graph below, plot the points, $(\theta, \cos \theta)$. Connect the points with a smooth curve. This graph represents the graph of the cosine function.

$y = \cos \theta$



$$\rightarrow \tan \theta = \frac{\sin \theta}{\cos \theta}$$

Complete the following table for $\tan \theta$. Find the values of $\tan \theta$ for each angle.

θ (degree) x	0°	30°	45°	60°	90°	120°	135°	150°	180°
$\tan \theta$ (nearest tenth), y	$0/1$ 0	$\frac{1/2}{\sqrt{3}/2}$ $\frac{\sqrt{3}}{3} = .58$	$\frac{\sqrt{2}/2}{\sqrt{2}/2}$ 1	$\frac{\sqrt{3}/2}{1/2}$ $\sqrt{3} = 1.73$	$1/0$ und.	$\frac{\sqrt{3}/2}{-1/2}$ $-\sqrt{3} = -1.73$	$\frac{\sqrt{2}/2}{-\sqrt{2}/2}$ -1	$\frac{1/2}{-\sqrt{3}/2}$ $-\frac{\sqrt{3}}{3} = -.58$	$0/-1$ 0

θ (degree) x	210°	225°	240°	270°	300°	315°	330°	360°	390°
$\tan \theta$ (nearest tenth), y	$\frac{1/2}{-\sqrt{3}/2}$ $-\frac{\sqrt{3}}{3} = -.58$	$\frac{-\sqrt{2}/2}{-\sqrt{2}/2}$ 1	$\frac{-\sqrt{3}/2}{1/2}$ $-\sqrt{3} = -1.73$	$-1/0$ und	$\frac{-\sqrt{3}/2}{1/2}$ $-\sqrt{3} = -1.73$	$\frac{-\sqrt{2}/2}{\sqrt{2}/2}$ -1	$-\sqrt{3}/3$ -.58	$0/1$ 0	

To graph the function $y = \tan \theta$, use values of θ expressed in either degrees or radians. These values represent the x values on a graph. Use the values of $\tan \theta$ expressed as a value rounded to the nearest tenth to represent the y values on the graph.

Ordered pairs for points on these graphs are of the form $(\theta, \tan \theta)$.

On the graph below plot the points, $(\theta, \tan \theta)$. Connect the points with a smooth curve, but there should be breaks in the graph where there is an "error" or undefined value. This graph represents the graph of the tangent function.

