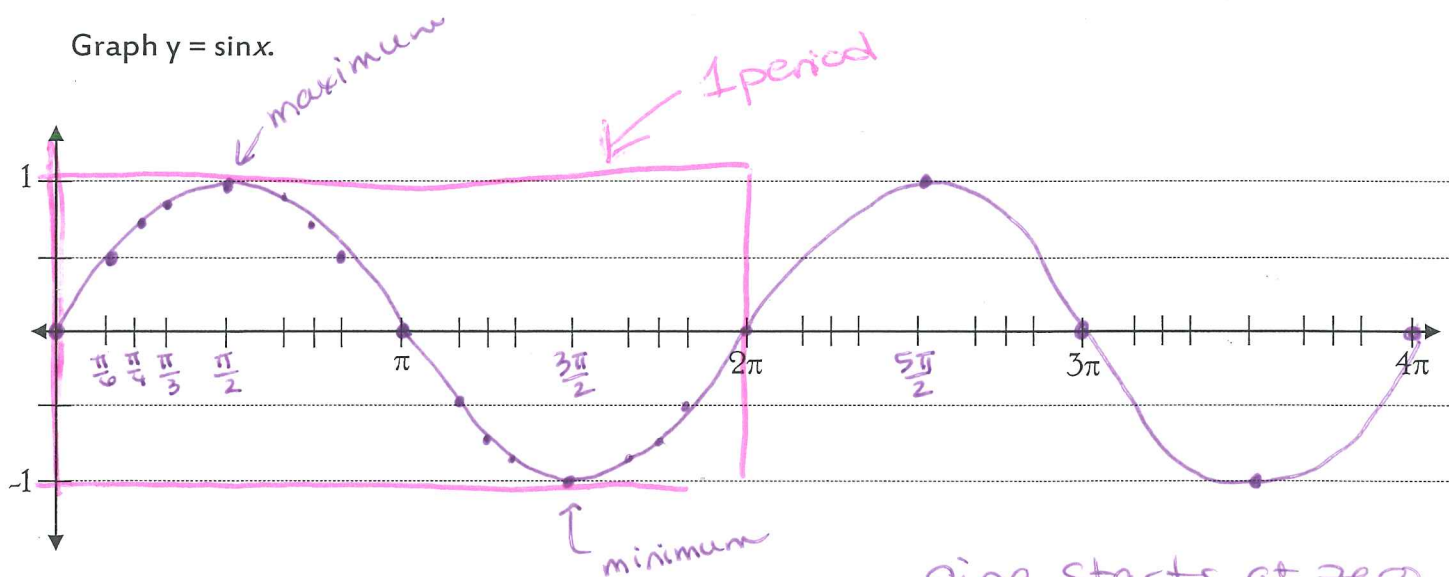


Exploring the Graph of the Sine Function

Using the unit circle, fill in the chart below with the value of sine at each angle.

Degrees	0	30	45	60	90	120	135	150	180	210	225	240	270	300	315	330	360
Radians	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π	$\frac{7\pi}{6}$	$\frac{5\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{7\pi}{4}$	$\frac{11\pi}{6}$	2π
Sine (exact)	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	0
Sine (decimal)	0	.5	.707	.866	1	.866	.707	.5	0	-.5	-.707	-.866	-1	-.866	-.707	-.5	0

Graph $y = \sin x$.



1. The period is 2π ← length of the section that repeats

2. The domain is $(-\infty, \infty)$ \mathbb{R} ← x-values

3. The range is $[-1, 1]$ ← y-values

4. The x-intercepts are all multiples of π

$\pi k, k \in \mathbb{Z}$ ← integers
 $\pi n, n \in \mathbb{Z}$
epsilon "is an element of"

5. The y-intercept is 0

6. The maximum values are 1 and occur when $\frac{\pi}{2} + 2\pi k, k \in \mathbb{Z}$

7. The minimum values are -1 and occur when $\frac{3\pi}{2} + 2\pi k, k \in \mathbb{Z}$

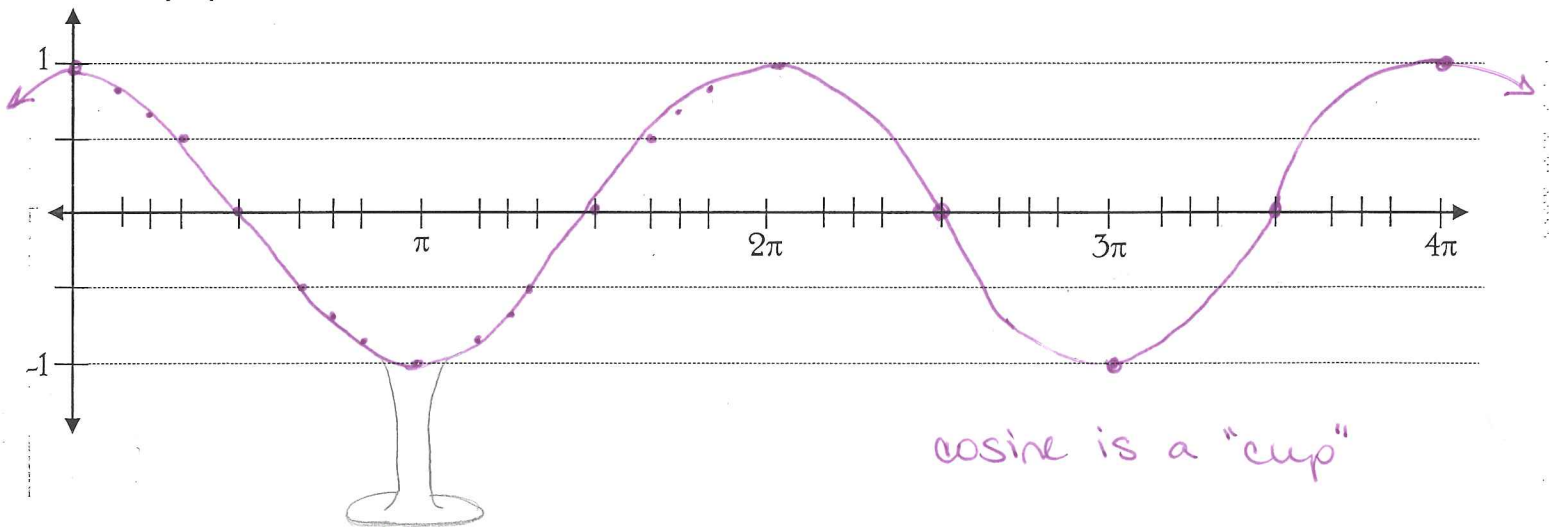
↑
every 2π later

Exploring the Graph of the Cosine Function

Using the unit circle, fill in the chart below with the value of cosine at each angle.

Degrees	0	30	45	60	90	120	135	150	180	210	225	240	270	300	315	330	360
Radians	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π	$\frac{7\pi}{6}$	$\frac{5\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{7\pi}{4}$	$\frac{11\pi}{6}$	2π
Cosine (exact)	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
Cosine (decimal)	1	.866	.707	.5	0	-.5	-.707	-.866	-1	-.866	-.707	-.5	0	.5	.707	.866	1

Graph $y = \cos x$.



1. The period is 2π
2. The domain is $(-\infty, \infty)$
3. The range is $[-1, 1]$
4. The x-intercepts are $\frac{\pi}{2} + \pi k, k \in \mathbb{Z}$
5. The y-intercept is 1
6. The maximum values are 1 and occur when $0 + 2\pi k, k \in \mathbb{Z}$
7. The minimum values are -1 and occur when $\pi + 2\pi k, k \in \mathbb{Z}$