

7.5 Properties of Trig Functions Cont'd

- 1) Domain
- 2) Period
- 3) Odd-Even (Symmetry)

Odd-Even Properties of Trig Functions

$$\sin(-\theta) = -\sin \theta$$

$$\csc(-\theta) = -\csc \theta$$

$$\tan(-\theta) = -\tan \theta$$

$$\cot(-\theta) = -\cot \theta$$

"odd functions"

symmetric about origin

(graph looks the same when rotated by 180°)

$$\cos(-\theta) = \cos \theta$$

$$\sec(-\theta) = \sec \theta$$

"even function"

symmetric about y-axis

Ex: Simplify

a) $\sin\left(-\frac{\pi}{6}\right)$

$$= -\sin \frac{\pi}{6}$$

$$= -\frac{1}{2}$$



b) $\cot\left(-\frac{\pi}{6}\right)$

$$= -\cot \frac{\pi}{6}$$

$$= -\frac{\sqrt{3}}{1} \text{ or } -\sqrt{3}$$

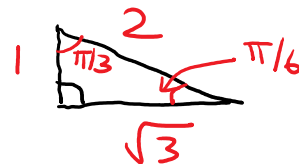
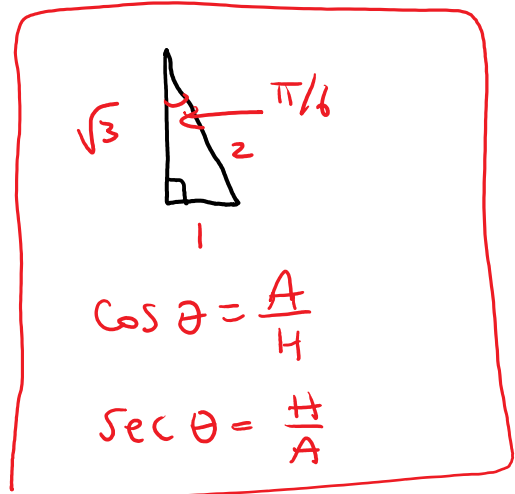
$$\tan \theta = \frac{O}{A}$$

$$\cot \theta = \frac{A}{O}$$

$$c) \sec \left(-\frac{\pi}{6} \right)$$

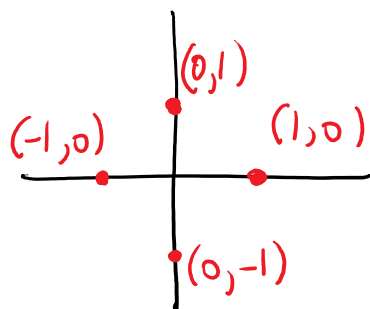
$$= \sec \frac{\pi}{6}$$

$$= \frac{2}{\sqrt{3}} \text{ or } \frac{2\sqrt{3}}{3}$$



7.6 Graphs of Sine and Cosine Functions

Recall $\sin \theta = \frac{y}{r}$



$r = \text{distance to origin}$
 $= 1$

θ	$\sin \theta \leftarrow \frac{y}{r}$
0	0
$\pi/2$	1
π	0
$\frac{3\pi}{2}$	-1
2π	0

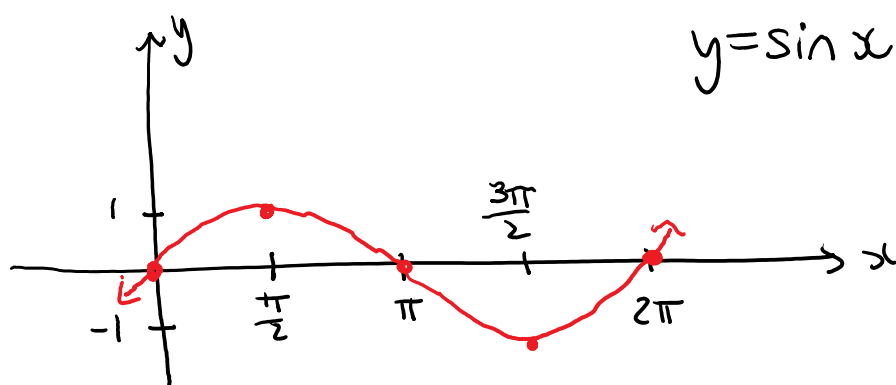
Confirm on calculator
 (Radian Mode)

$\sin\left(\frac{3\pi}{2}\right)$

More common notation :

x	$y = \sin x$
0	0
$\pi/2$	1
π	0
$\frac{3\pi}{2}$	-1
2π	0

$\frac{\pi}{2} \approx 1.5$



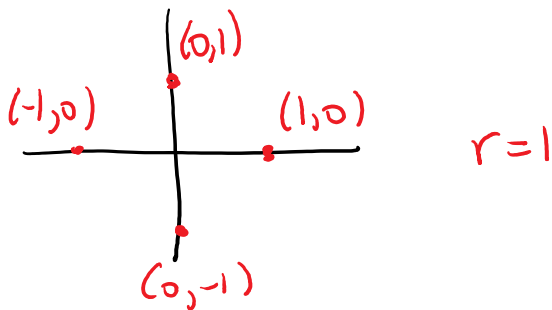
Properties of $y = \sin x$

odd function

period = 2π

range: $-1 \leq y \leq 1$

Recall $\cos \theta = \frac{x}{r}$

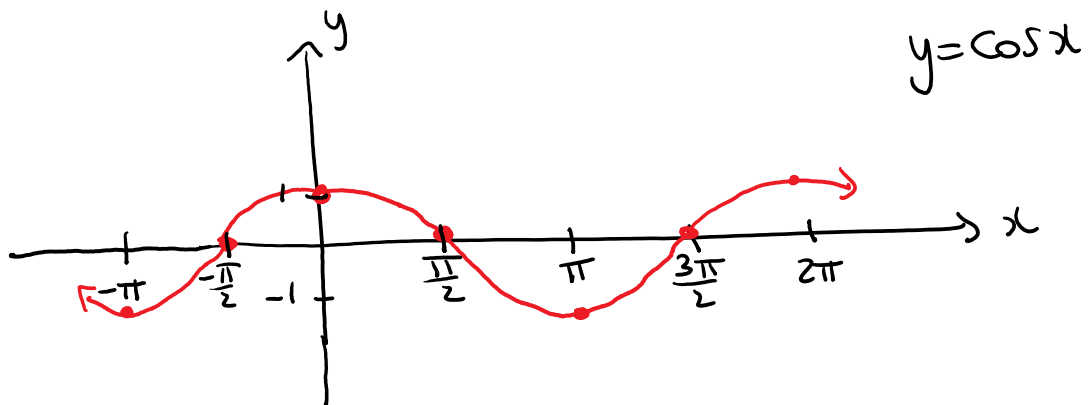


θ	$\cos \theta$
0	1
$\frac{\pi}{2}$	0
π	-1
$\frac{3\pi}{2}$	0
2π	1

← $\frac{x}{r}$

More Common notation:

x	$y = \cos x$
0	1
$\pi/2$	0
π	-1
$\frac{3\pi}{2}$	0
2π	1



Properties of $y = \cos x$

Period = 2π

Range: $-1 \leq y \leq 1$

Even function (symmetric about y-axis)