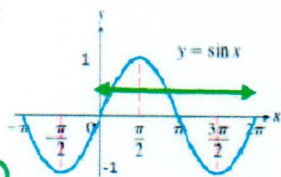


# Trigonometric Functions

$$y = \sin x$$



Domain:  $\mathbb{R}$

Range:  $[-1, 1]$

Period:  $2\pi$

$$\sin(\theta + 2\pi) = \sin \theta$$

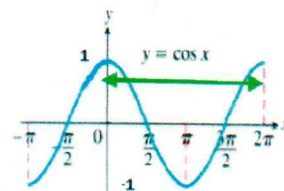
Odd function:

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

$$-1 \leq \sin x \leq 1 \Leftrightarrow |\sin x| \leq 1$$

$\sin x = 0$  when  $x = 0, \pm\pi, \pm2\pi, \pm3\pi, \dots$

$$y = \cos x$$



Domain:  $\mathbb{R}$

Range:  $[-1, 1]$

Period:  $2\pi$

$$\cos(\theta + 2\pi) = \cos \theta$$

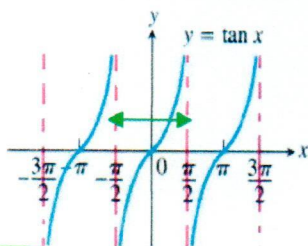
Even function:

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

$$-1 \leq \cos x \leq 1 \Leftrightarrow |\cos x| \leq 1$$

$\cos x = 0$  when  $x = \pm\frac{\pi}{2}, \pm\frac{3\pi}{2}, \pm\frac{5\pi}{2}, \dots$

$$y = \tan x$$



Domain:

$$\mathbb{R} - \left\{ \pm\frac{\pi}{2}, \pm\frac{3\pi}{2}, \dots \right\}$$

Range:  $\mathbb{R}$

Period:  $\pi$

$$\tan(\theta + \pi) = \tan \theta$$

Odd function:

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

$$y = \cot x$$

Domain:

$$\mathbb{R} - \{0, \pm\pi, \pm2\pi, \dots\}$$

Period:  $\pi$

$$\cot(\theta + \pi) = \cot \theta$$

Odd function:

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

$$y = \csc x$$

Domain:

$$\mathbb{R} - \{0, \pm\pi, \pm2\pi, \dots\}$$

Period:  $2\pi$

$$\csc(\theta + 2\pi) = \csc \theta$$

Odd function:

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

$$y = \sec x$$

Domain:

$$\mathbb{R} - \left\{ \pm\frac{\pi}{2}, \pm\frac{3\pi}{2}, \dots \right\}$$

Period:  $2\pi$

$$\sec(\theta + 2\pi) = \sec \theta$$

Even function:

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

