Trigonometry

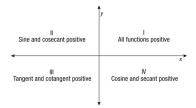
Basic Trigonometric Functions

Reference Angle: The acute angle between x-axis and the terminal side (always positive)

$$sin = \frac{y}{r} \qquad csc = \frac{r}{y}$$

$$cos = \frac{x}{r} \qquad sec = \frac{r}{x}$$

$$tan = \frac{y}{x} \qquad cot = \frac{x}{y}$$



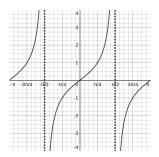


Figure 3: $y = \tan(x)$

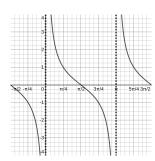


Figure 4: $y = \cot(x)$

Graphing Trigonometric Functions

Assume...

$$-y = d + a * trig(bx - c)$$

- Amplitude =
$$|a|$$

- Vertical Shift =
$$a$$

- Phase Shift =
$$\frac{c}{h}$$

$$\begin{array}{l} -y=d+a*trig(bx-c)\\ -\text{ Amplitude}=|a|\\ -\text{ Vertical Shift}=d\\ -\text{ Phince Shift}=\frac{c}{b}\\ -\text{ X-Scale (change between critical points)}=\frac{\text{period}}{4}\\ -\text{ Period depends on what functions}\\ -\text{ sin, cos, csc, sec}=\frac{2\pi}{b}\\ -\text{ tan, cot}=\frac{\pi}{b} \end{array}$$

$$-\sin, \cos, \csc, \sec = \frac{2\pi}{h}$$

$$-\tan, \cot = \frac{\pi}{L}$$

Examples...

Trigonometric Identities

$$\sin = \frac{1}{\csc} \qquad \csc = \frac{1}{\sin}$$

$$\cos = \frac{1}{\sec} \qquad \sec = \frac{1}{\cos}$$

$$\tan = \frac{\sin}{\cos} \qquad \cot = \frac{\cos}{\sin}$$

$$\sin^2 + \cos^2 = 1$$

$$1 + \tan^2 = \sec^2$$

$$1 + \cot^2 = \csc^2$$

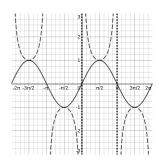


Figure 1: $y = \sin(x), y = \csc(x)$

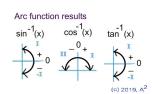
Arcs

In radians unless specified otherwise

 $Exact \implies picture$

Round \implies calculator (\sin^{-1})

$$\sin(\theta) = -\frac{\sqrt{3}}{2}$$
$$\sin^{-1}(-\frac{\sqrt{3}}{2})$$
$$\arcsin(-\frac{\sqrt{3}}{2})$$



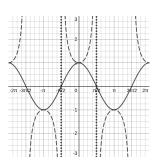


Figure 2: $y = \cos(x), y = \sec(x)$