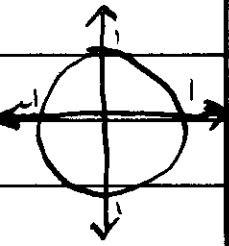


# Trig 6.3 Trig Functions of Real Numbers

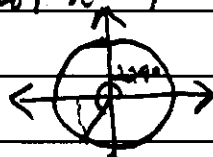


Today we only consider Unit Circle in  $x, y$  plane system  
 Def. The value of a trig function of a real number  $t$  is its value at an angle of  $t$  radians, provided that value exists.

Ex. Find the sine value for  $t=4$

$$t = 4 \text{ radians}$$

$$4 \times \frac{180^\circ}{\pi} = 229^\circ$$



Use calculator, press 229, press sin, =  $-.75$

Ex Find the values of trig function at  $t$   $P(-\frac{15}{17}, \frac{8}{17})$

$$\sin t = \frac{y}{r} = y = \frac{8}{17}$$

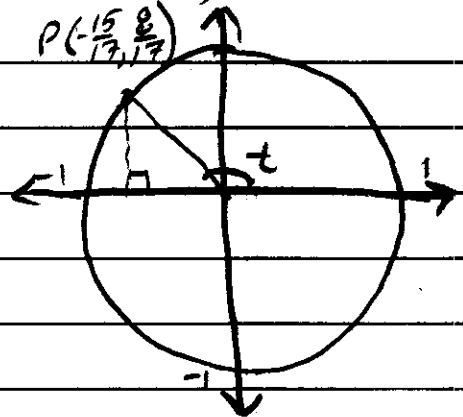
$$\cos t = \frac{x}{r} = x = -\frac{15}{17}$$

$$\tan t = \frac{y}{x} = \frac{8}{-15} = -\frac{8}{15}$$

$$\cot t = -\frac{15}{8}$$

$$\sec t = -\frac{17}{15}$$

$$\csc t = \frac{17}{8}$$



Important

Ex Given a point  $P(-\frac{12}{13}, \frac{5}{13})$  on a unit circle corresponding to  $t$ . Find the coordinates of the following points

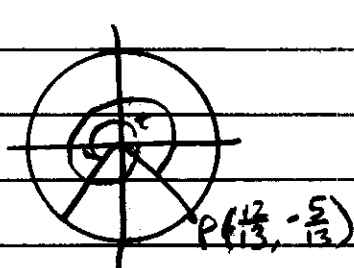
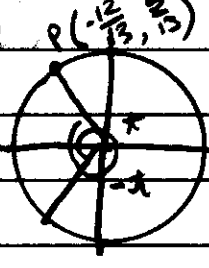
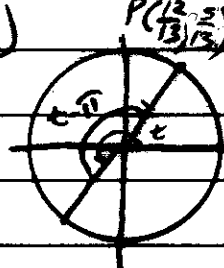
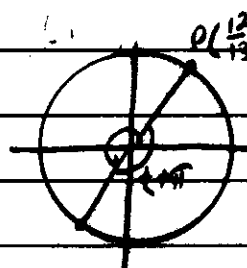
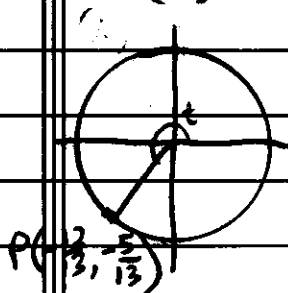
$$P(t)$$

$$P(t+\pi)$$

$$P(t-\pi)$$

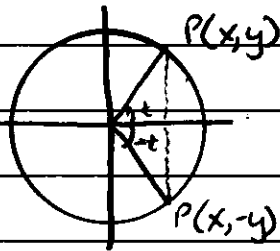
$$P(-t)$$

$$P(-t-\pi)$$



# Trig 6.3

## Formulas for Negatives



For  $t$

$$\sin t = \frac{y}{r} = y$$

$$\cos t = \frac{x}{r} = x \quad \longleftrightarrow$$

$$\tan t = \frac{y}{x}$$

$$\cot t = \frac{x}{y}$$

$$\sec t = \frac{r}{x} \quad \longleftrightarrow$$

$$\csc t = \frac{r}{y}$$

For  $-t$

$$\sin(-t) = \frac{-y}{r} = -y$$

$$\cos(-t) = \frac{x}{r} = x$$

$$\tan(-t) = \frac{-y}{x} = -\frac{y}{x}$$

$$\cot(-t) = \frac{x}{-y} = -\frac{x}{y}$$

$$\sec(-t) = \frac{r}{x}$$

$$\csc(-t) = -\frac{r}{y}$$

$\cos(-t) = \cos t$
$\sec(-t) = \sec t$
$\sin(-t) = \sin -t$
$\tan(-t) = \tan -t$
$\cot(-t) = \cot -t$
$\csc(-t) = \csc -t$