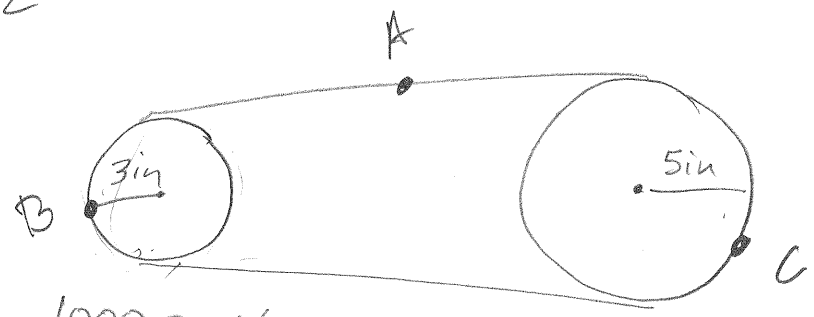
9/7/2012 - Sec 1.4 Math 1060

#42



1000 Rev/min

$V = r \cdot \omega$ ← Rad/time

$V = 3\text{ in} \cdot \frac{2000\pi}{\text{min}}$

$= \frac{6000\pi\text{ in.}}{\text{min}}$

$\omega_s = 2000\pi \frac{\text{Rad}}{\text{min}}$

$\frac{1000\ \text{Rev}}{\text{min}} \cdot \frac{2\pi\ \text{Rad}}{1\ \text{Rev}}$

$\frac{6000\pi\ \text{in}}{\text{min}} \cdot \frac{1\ \text{ft}}{12\ \text{in}} \cdot \frac{1\ \text{min}}{60\ \text{sec}}$

$\frac{100\pi}{12}\ \text{ft/sec} = 26.8\ \text{ft/sec}$

Angular Velocity

$\omega = \frac{\alpha}{t}$ $\quad V = r \cdot \omega$

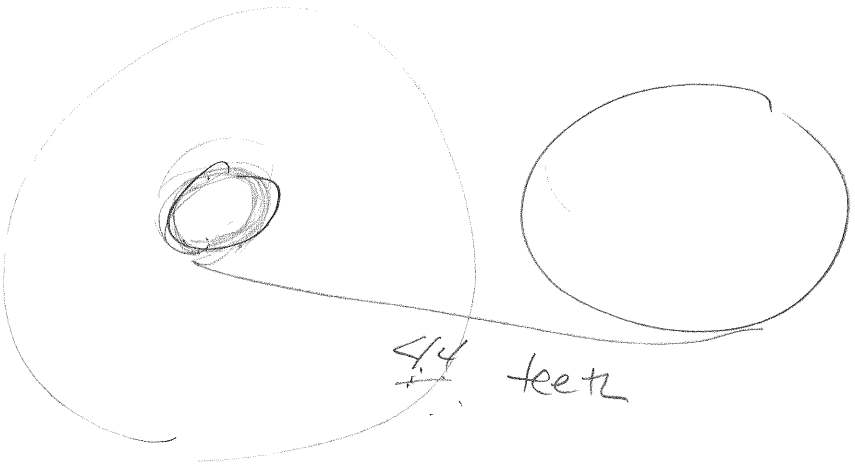
$\frac{26.8\ \text{ft}}{\text{sec}} = 5\text{in} \cdot \omega$

$\frac{1}{5\text{in}} \cdot \frac{20}{100\pi\ \text{in}}{\text{sec}} = \frac{5\text{in}}{5\text{in}} \cdot \omega$

$\omega = 20\pi \frac{\text{Rad}}{\text{sec}}$

$$\frac{20\pi \text{ rad}}{\text{sec}} \cdot \frac{1 \text{ Rev}}{2\pi \text{ rad}} \cdot \frac{60 \text{ sec}}{1 \text{ min}}$$

$$\boxed{\omega = 600 \text{ Rev/min}}$$



$\omega = \frac{44}{13}$ Rev/sec, diameter was 26 in
Radius = 13 in

$$V = 13 \text{ in} \cdot \frac{88\pi}{13 \text{ sec}}$$

$$\frac{44 \text{ Rev}}{13 \text{ sec}} \cdot \frac{2\pi \text{ Rad}}{1 \text{ Rev}} = \frac{88\pi \text{ Rad}}{13 \text{ sec}}$$

$$V = 88\pi \text{ in/sec}$$

Sec 1.4 The Trigonometric Function

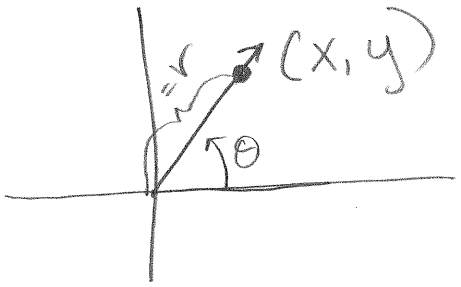
Six Trig functions

sine (sin) cosine (cos) tangent (tan)

cosecant (csc) secant (sec) cotangent (cot)

Defn: The trig functions

If (x, y) is any point other than the origin on the terminal side of an angle θ in standard position and $r = \sqrt{x^2 + y^2}$, then



$$\sin\theta = \frac{y}{r}, \quad \cos\theta = \frac{x}{r}, \quad \tan\theta = \frac{y}{x}$$

$$\csc\theta = \frac{r}{y}, \quad \sec\theta = \frac{r}{x}, \quad \cot\theta = \frac{x}{y}$$

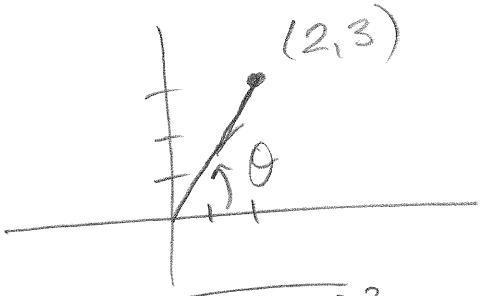
Reciprocal Identities

$$\csc\theta = \frac{1}{\sin\theta}, \quad \sec\theta = \frac{1}{\cos\theta}, \quad \cot\theta = \frac{1}{\tan\theta}$$

$$\sin\theta = \frac{1}{\csc\theta} \rightarrow \text{Similary}$$

Ex: I have an angle that passes through the point (2, 3)

Find all 6 trig function values of the angle in standard form



$r = \sqrt{(2)^2 + (3)^2}$

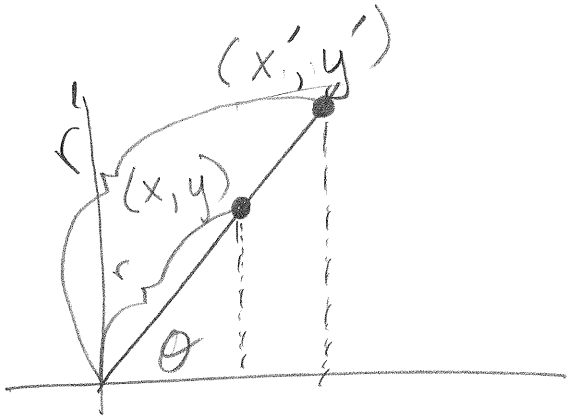
$= \sqrt{4 + 9}$

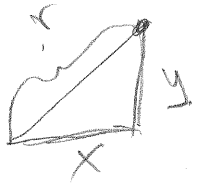
$= \sqrt{13}$

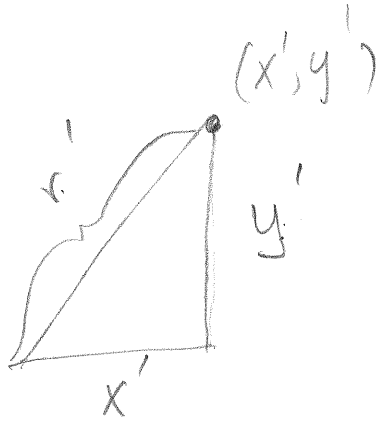
$\sin\theta = \frac{3}{\sqrt{13}} = \frac{3\sqrt{13}}{13}$ $\cos\theta = \frac{2}{\sqrt{13}} = \frac{2\sqrt{13}}{13}$ $\tan\theta = \frac{3}{2}$

$\csc\theta = \frac{\sqrt{13}}{3}$ $\sec\theta = \frac{\sqrt{13}}{2}$ $\cot\theta = \frac{2}{3}$

Recall $\frac{3}{\sqrt{13}} \cdot \frac{\sqrt{13}}{\sqrt{13}} = \frac{3\sqrt{13}}{13}$

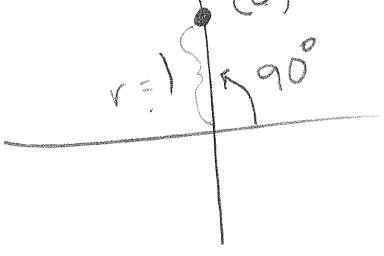






$\sin\theta = \frac{y}{r} = \frac{y'}{r'}$

Evaluate trig functions for Quadrantal angles



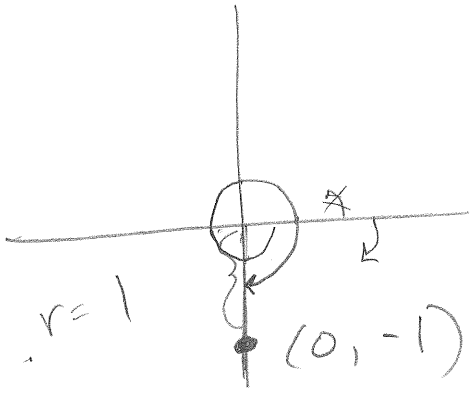
$\sin 90° = \frac{1}{1} = 1$ $\cos 90° = \frac{0}{1} = 0$ $\tan 90° = \frac{1}{0}$

tan 90° is undefined

$\csc 90° = 1$ $\sec 90° = \frac{1}{0}$ is undefined

$\cot 90° = \frac{0}{1} = 0$

$-\frac{5\pi}{2}$



$r = \sqrt{0^2 + (-1)^2}$

$= \sqrt{0 + 1}$

$= \sqrt{1}$

$= 1$

$\sin\left(-\frac{5\pi}{2}\right) = \frac{-1}{1} = -1$

the sign of the trig function depends on the quadrant where the angle lies.

$\sin\theta = \frac{y}{r}$ $\cos = \frac{x}{r}$ $\tan \frac{y}{x}$

$x<0, y>0$	$x>0, y>0$
II	I
Sine students	All
III	IV
tangent take	cosine calculus
$x<0, y<0$	$x>0, y<0$