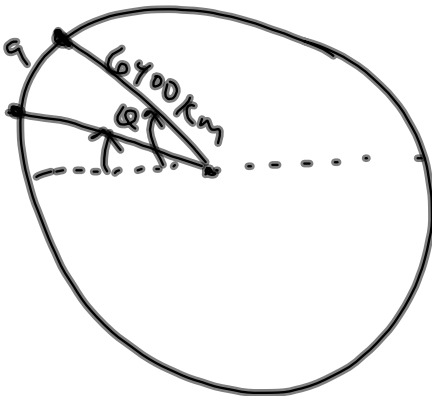Practice Problems...

Page 176 - 179
#14, 15, 16, 19, 20 a, b , 21, 22, 23, 24, 25, 26, 27

$$\theta = \frac{d}{r}$$

$69.375°$

$69°\ 22'\ 30''$

$0.375 \times 60 = \underline{\underline{22.5}}$

$0.5 \times 60 \text{ sec}$

↑ Minutes ↑ seconds

$14.\ 565° \Rightarrow 14°\ 33'\ 54''$

$0.565 \times 60 = 33.9 \text{ min}$

$0.9 \times 60 = 54 \text{ sec}$

$77.827° = \underline{77°\ 49'\ 37''}$

19. 1 Rot = 400 grad

360° = 400 grad

2π Rad = 400 grad

a) $50° \times \dfrac{400 \text{ grad}}{360°} = 55.\overline{5}$ grad

b) factor label method

Warm Up

A basketball rolling across the floor completes 75 revolutions per minute. The linear velocity of the basketball is 2.5 m/s. Find the radius of the basketball and its angular velocity.
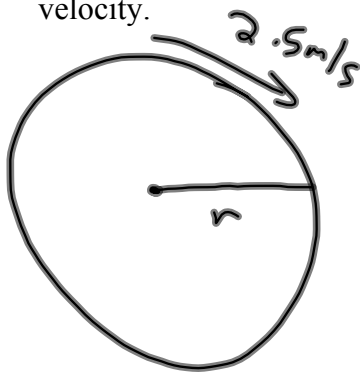
$$75 \cancel{rpm} \times 2\pi \frac{Rad}{1\cancel{Rev}}$$

$$= 150\pi \; Rad/min. \times \frac{1 \; min}{60 \; Sec}$$

$$= 7.85 \; Rad/Sec$$

$$\theta = \frac{a}{r}$$

$$r = \frac{a}{\theta}$$

After 1 Sec...

$$arc = 2.5m$$

$$\theta = 7.85 \; Rad$$
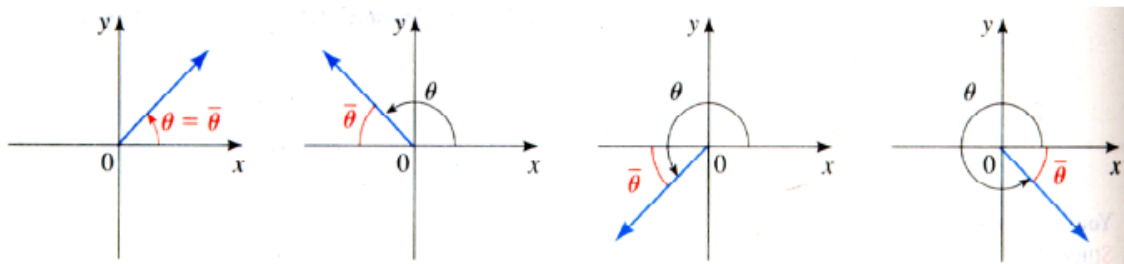
$$r = \frac{2.5m}{7.85 \; Rad}$$

$$r = 0.32m$$

$$C = 2\pi r$$

Reference Triangles:

Definition 17 *The reference angle $\overline{\theta}$ of an angle θ in standard position is the acute angle (between 0 and 90°) the terminal side makes with the x-axis.*
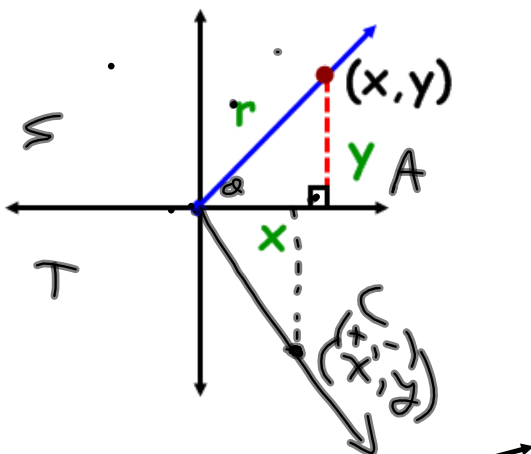
The picture below illustrates this concept.

What is the significance of reference angles?

Angles on the Cartesian Plane

- **Reference Angle -** an acute angle formed between the terminal arm and the x-axis.

- **Reference Triangle -** a triangle formed by drawing a perpendicular line from a point on the terminal to the x-axis.

Notice what will happen if the rotation moves into other quadrants?

TRIG RATIOS on the CARTESIAN PLANE

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

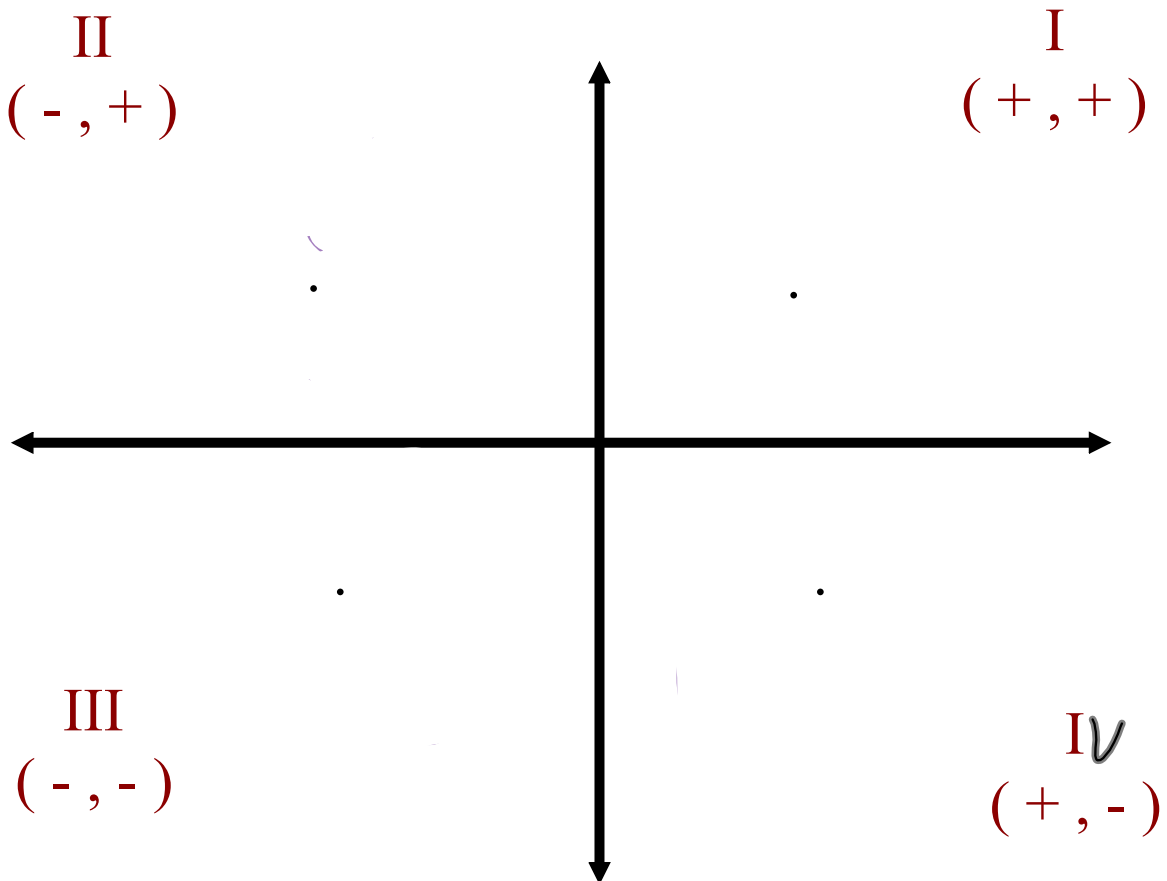$$\cos\theta = \frac{x}{r} \qquad \sec\theta = \frac{r}{x}$$

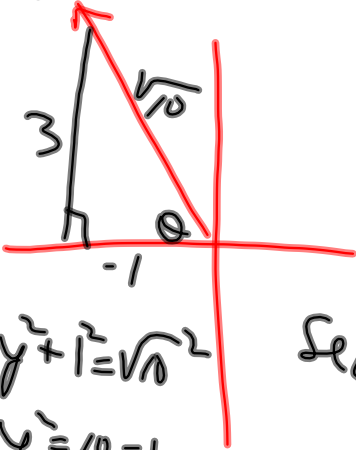$$\tan\theta = \frac{y}{x} \qquad \cot\theta = \frac{x}{y}$$

"Primary"   "Reciprocal"

TRIG RATIOS IN ALL 4 QUADRANTS

What primary trig ratios are POSITIVE in...

II
(- , +)

I
(+ , +)

III
(- , -)

IV
(+ , -)

If $\sec\theta = \ominus\sqrt{10}$ and $\sin\theta > 0$, determine the value of $\csc\theta$.

→ Where is θ?
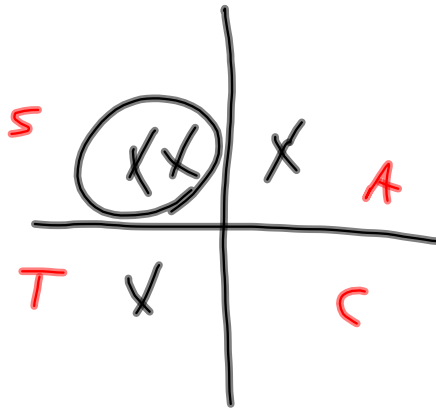

3 $\sqrt{10}$

-1 θ

$y^2 + 1^2 = \sqrt{10}^2$
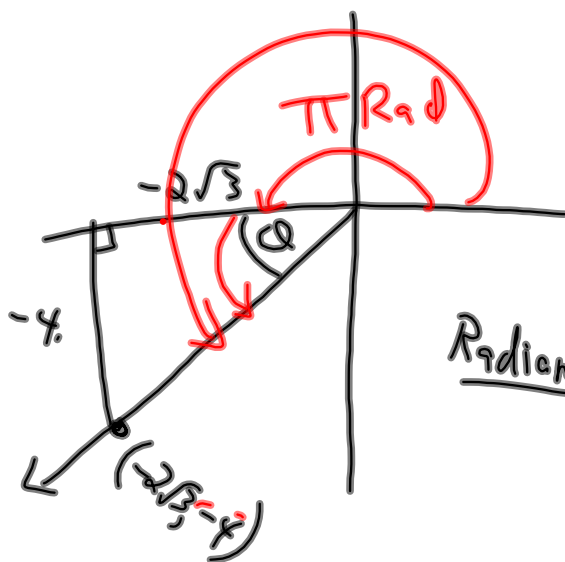
$y^2 = 10 - 1$

$y = 3$

$\sec\theta = -\dfrac{\sqrt{10}}{1}$

$\csc\theta = \dfrac{\sqrt{10}}{3}$

S

T   X

A

C

8

Example

Determine the measure (in radians) of an angle whose terminal arm passes through the ordered pair $\left(-2\sqrt{3}, -4\right)$

$\tan \theta = \dfrac{4}{2\sqrt{3}}$

Radians:

$\tan^{-1}\left(4 / \left(2\sqrt{3}\right)\right)$

$\theta = 0.8571 \, Rad$

$+ \pi$

$\theta = 3.999 \, Rad$

$229° \times \dfrac{\pi \, Rad}{180°}$