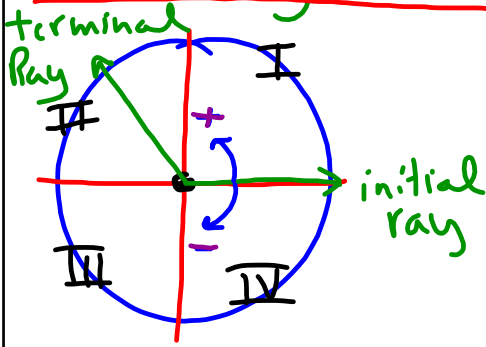


# 7.1 Angles & Radians



## Angle in Standard Position

- center at the origin
- initial ray at  $\oplus$  x-axis

A pair of rays form  $m^\circ$  both positive and negative angles

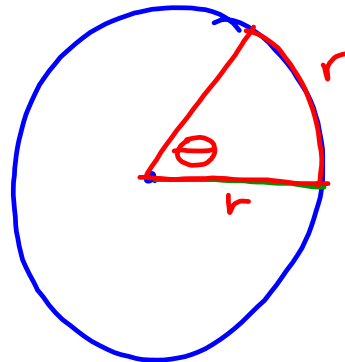
## coterminal angles:

Have same initial & terminal rays.  
differ by direction (+/-) and number of rotations.

$$64^\circ \frac{15'}{60} \frac{47''}{3600}$$

Radians

$\Theta$ : theta



1 radian is the central that subtends an arc length equal to the radius

$$1 \text{ radian} \approx 57^\circ$$

$$\text{Circumference} = 2\pi r$$

$2\pi$  radians in a full circle.

Conversions:

<u>radians</u>	<u>Degrees</u>	
$2\pi$	$360^\circ$	$\frac{2\pi}{3} = 2(60^\circ) = 120^\circ$
$\pi$	$180^\circ$	
$\frac{\pi}{2}$	$90^\circ$	$135^\circ = 3(45^\circ) = \frac{3\pi}{4}$
$\frac{\pi}{3}$	$60^\circ$	$\frac{7\pi}{6} = 7(30^\circ) = 210^\circ$
$\frac{\pi}{4}$	$45^\circ$	$300^\circ = 5(60^\circ) = \frac{5\pi}{3}$
$\frac{\pi}{6}$	$30^\circ$	

Complex ConversionsDegrees  $\rightarrow$  Radians

$\times \frac{\pi}{180^\circ}$

$225^\circ \cdot \frac{\pi}{180} = \frac{225}{180} = \frac{5\pi}{4}$

$307^\circ \cdot \frac{\pi}{180} \sim 1.71\pi \sim 5.36$   
radians

Radians  $\rightarrow$  Degrees

$\times \frac{180^\circ}{\pi}$

$\frac{23\pi}{11} \times \frac{180^\circ}{\pi} = 376.\overline{36}^\circ$

$2.35 \text{ radians} \times \frac{180^\circ}{\pi} = 134.65^\circ$