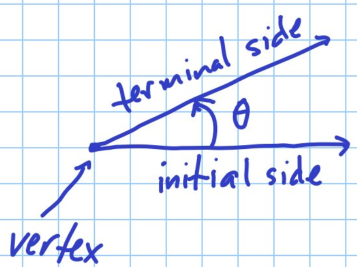
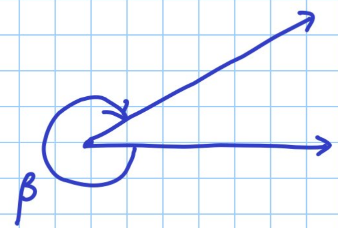
Section 5.1 Angles and Their Measures

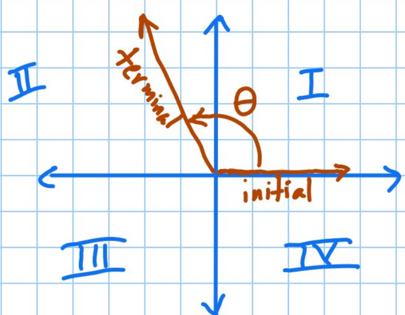




counterclockwise
positive angle measure

clockwise
negative angle measure

Standard Position - initial side is the positive x-axis



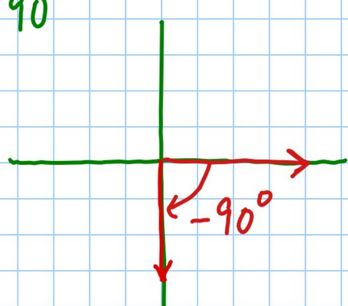
We say θ lies in Quadrant II because its terminal side is in QII.

When the terminal side lies on an axis we say the angle is a quadrantal angle.

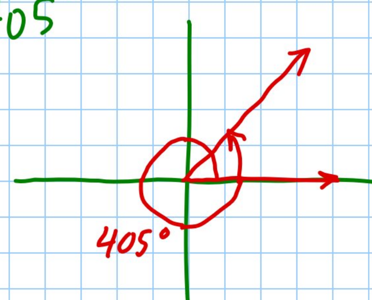
One way to measure angles is in degrees. There are 360° in one revolution. A straight angle is 180°. A right angle measures 90°.

Draw angle in standard position

ex: -90°



ex: 405°



To get angle measures more precisely we use <u>minutes</u> and <u>seconds</u>

There are 60 minutes in 1 degree

There are 60 seconds in 1 minute

There are 3600 seconds in 1 degree

<u>Convert to decimal</u>:

$$50^\circ 6' 21'' = 50.106^\circ$$

50 2nd angle ° 2nd angle ' 21 '' enter

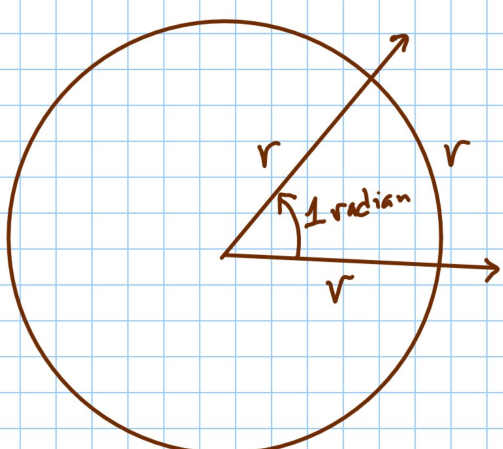
<u>Convert to degrees, minutes, seconds</u>:

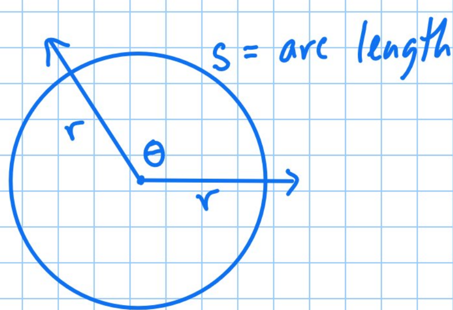
$$21.256^\circ = 21^\circ 15' 21.6''$$

21.256 2nd angle ▶DMS enter

A <u>central angle</u> is one whose vertex is the center of a circle.

We can also measure angles in radians. If the radius of the circle and the arc length are the same, the central angle is 1 radian.





If θ is in radians, then $s = r\theta$

What is angle in radians that is one revolution?

$$\text{one revolution has arc length} = \text{circumference}$$

$$\cancel{r}\theta = 2\pi\cancel{r}$$

$$\theta = 2\pi \text{ radians}$$

$$360^\circ = 2\pi \text{ radians}$$

$$1^\circ = \frac{2\pi}{360} = \frac{\pi}{180} \text{ radians}$$

To convert from degrees to radians, multiply by $\frac{\pi}{180}$

To convert from radians to degrees, multiply by $\frac{180}{\pi}$

ex: Convert 315° to radians

$$\frac{315}{1} \cdot \frac{\pi}{180} = \frac{7}{4}\pi = \frac{7\pi}{4}$$

315 * 1/180 ▶ FRAC

p 379
5-40 multiples of 5
69, 70, 75, 76

ex: Convert $\frac{5\pi}{6}$ to degrees

$$\frac{5\cancel{\pi}}{\cancel{6}_{1}} \cdot \frac{\cancel{180}^{30}}{\cancel{\pi}} = 150^\circ$$