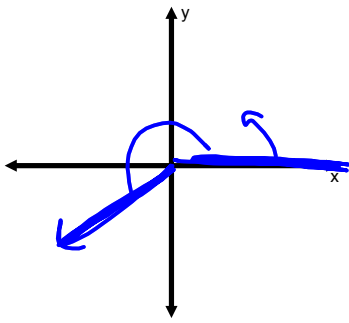HAT

Intro to Circular Trig
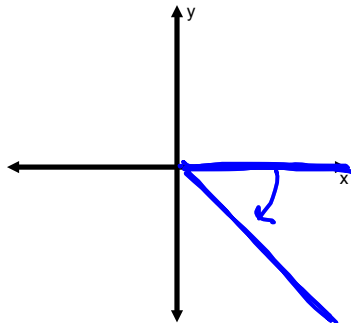
4/17/18

Ex1: Draw each angle in *standard position.*   Direction
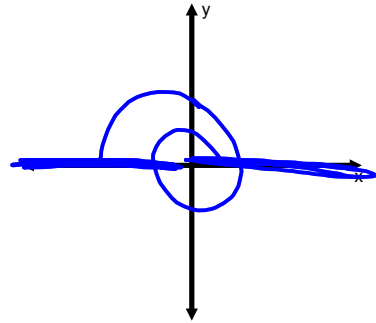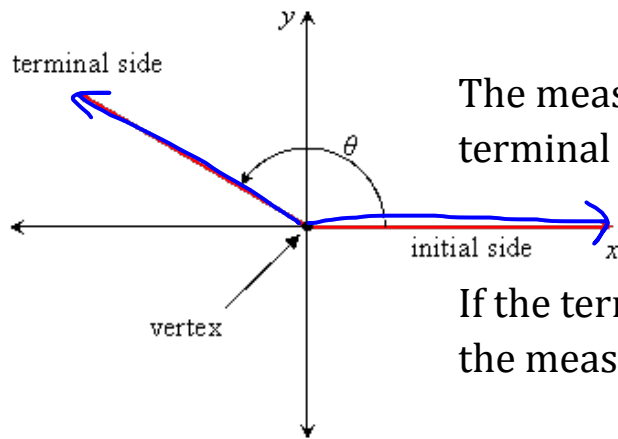
210°

-50°

540°

Angles in Standard Position

An angle is in *standard position* if the vertex is at the origin and one ray is on the positive *x*-axis.

terminal side

vertex

initial side

The measure of an angle is positive if the terminal side is rotated counterclockwise.

If the terminal side is rotated clockwise, the measure of the angle is negative.
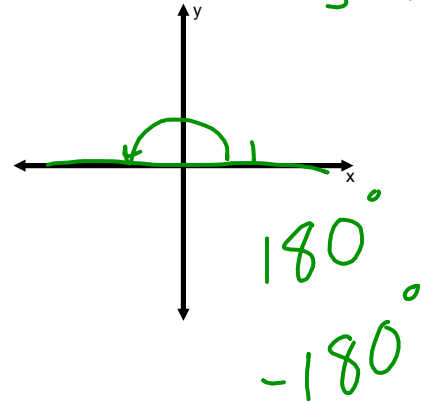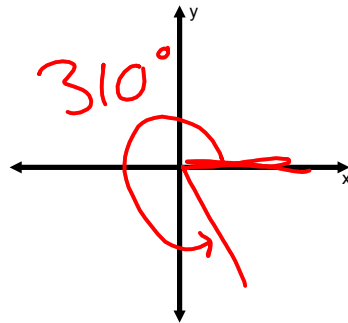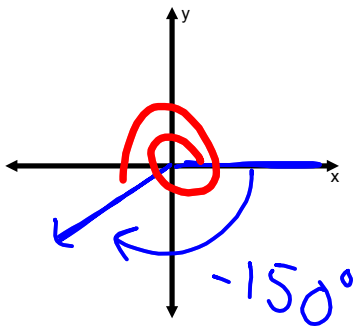
Ex2: Find a coterminal angle.

angles with the same terminal side.

Infinitely many coterminal ∠'s for each terminal side.

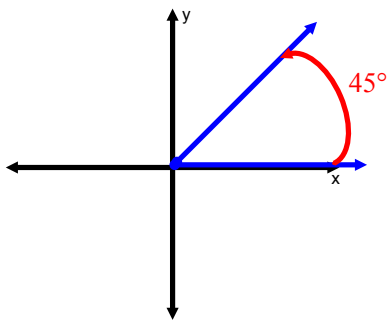210°   -50°   540°

-150°

310°

180°
-180°

Coterminal Angles

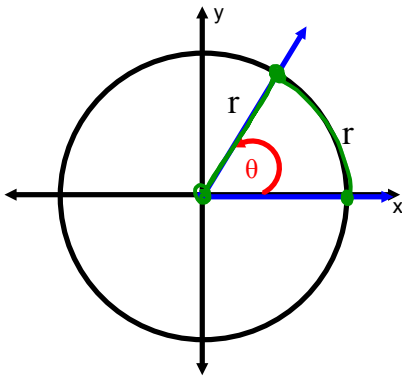Two or more angles in standard position with the same terminal side are called coterminal angles.

There are infinitely many coterminal angles for a single terminal side!!

Radians

theta
↓

One radian is the measure of an angle θ with a terminal side that intercepts an arc with the same length

(What does that even mean?!?)

How many radians are in one revolution?

When we travel along the circle for a distance of the radius, we have created an angle of one radian

Radian Worksheet

Ex3:

$2\pi \text{ rad} = 360°$

$\pi \text{ rad} = 180°$ ← $\#\text{degrees} = \text{rad} \cdot \dfrac{180}{\pi}$

Convert to degrees

Convert to radians

$\boxed{90}$ $\left(\dfrac{\pi}{2}\right) = \dfrac{\pi}{180}$

$\to x°$

$2 \cdot \dfrac{180}{\pi} = \left(\dfrac{360}{\pi}\right)°$

$\dfrac{-5\pi}{4} \cdot \dfrac{180}{\pi}$

$-5 \cdot 45 = \boxed{-225°}$

$\text{degrees} \cdot \dfrac{\pi}{180} = \text{rad}$

45°

$45° \cdot \dfrac{\pi}{180} = \boxed{\dfrac{\pi}{4}}$

$20\pi° \cdot \dfrac{\pi}{180} = \boxed{\dfrac{\pi^2}{9}}$

-270°

When no units are given with an angle measurement, it is in radians
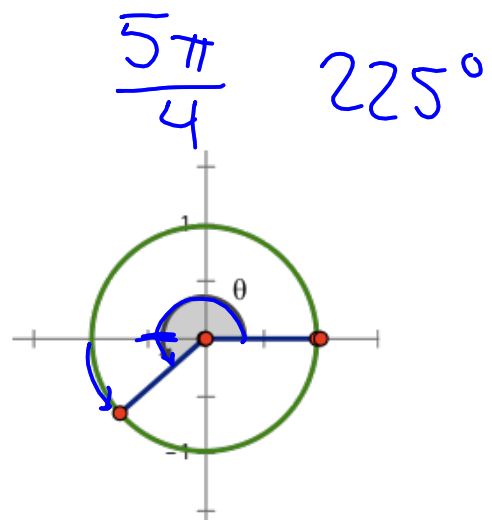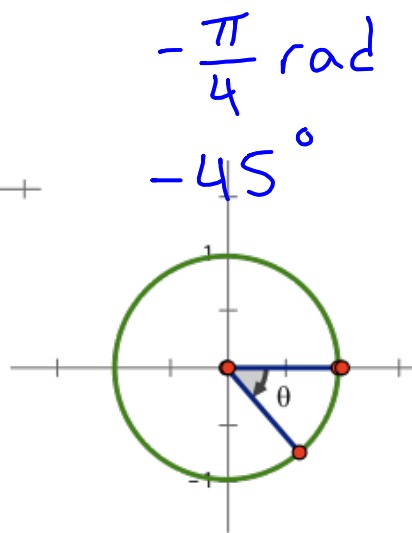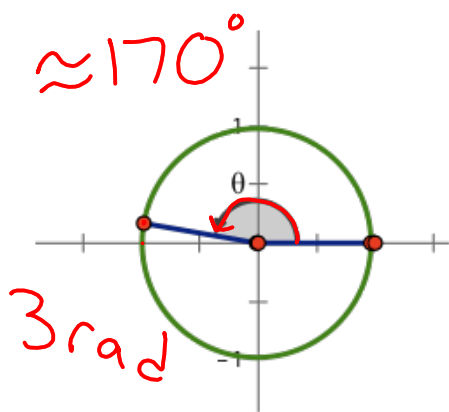
Converting Angle Measures
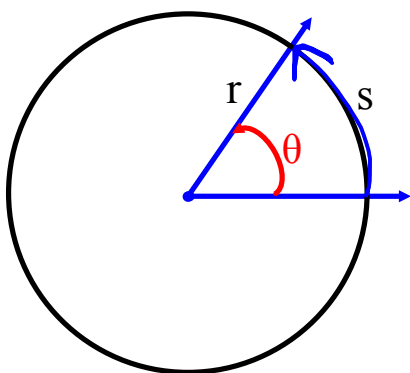
2π radians corresponds to 360°

π radians corresponds to 180°

Radians to Degrees $\quad rad \cdot \dfrac{180°}{\pi\, rad}$

Degrees to Radians

$deg \cdot \dfrac{\pi\, rad}{180°}$

Ex4: Approximate each angle θ in radians and degrees.

≈170°

3 rad

$-\dfrac{\pi}{4}$ rad

−45°

$\dfrac{5\pi}{4}$

225°

Ex5: Find the arc length of an angle of 60°.

$$2\pi r \cdot \frac{\theta}{360}$$

$$2\pi r \cdot \frac{60}{360}$$

$$\frac{2\pi r}{6} = \frac{\pi r}{3}$$

Arc Length

Find the fraction of one revolution
and multiply by the circumference.

Assignment:

page 803 #31, 33, 35, 36, 37, 39,
41, 43, 45, 47, 50