By the end of the lesson, we will be able to:

˜ Convert Degrees to Radians

˜ Convert Radians to Degrees

˜ Understand and use the terms: Initial Side, Terminal Side, Standard Position, and Coterminal Side

In most real-world applications, angles are measured in degrees. However, in upper-level math classes, angles are measured in radians. Radians are usually written in terms of π

Relationships between Radians and Degrees:

$$2\pi \text{ radians} = 360°$$

$$1 \text{ radian} = \frac{180°}{\pi} \approx 57.3° \qquad 1° = \frac{\pi \text{ radians}}{180} \approx 0.017 \text{ radians}$$

To convert between radians and degrees, you multiply by a **conversion factor**:
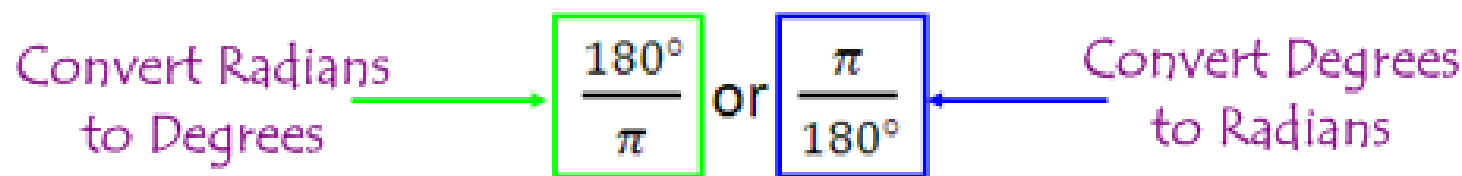
Convert Radians to Degrees $\longrightarrow$ $\dfrac{180°}{\pi}$ or $\dfrac{\pi}{180°}$ $\longleftarrow$ Convert Degrees to Radians

CAUTION: *An angle measure without a degree symbol means radians. If you want degrees, you must use °.*

Examples:

A. Convert $\frac{3\pi}{4}$ radians to degrees.

B. Convert $\frac{20\pi}{3}$ radians to degrees.

CAUTION: An angle measure without a degree symbol means radians. If you want degrees, you must use °.

Examples:

**C.** Convert 60° to radians.

D. Convert 330° to radians.

CAUTION: An angle measure without a degree symbol means radians. If you want degrees, you must use °.

The UNIT CIRCLE is a circle with radius of 1 unit, centered at the origin of a coordinate plane.

~ Angles in STANDARD POSITION on the unit circle have their vertex at the origin.

~ One side of the angle, called the INITIAL SIDE, is on the positive x-axis.

~ The other side, called the TERMINAL SIDE, determines the measure of the angle, and is measured counterclockwise.

Since there is a starting direction, angles can have any measure, positive or negative. The variable for angles is usually a Greek letter, commonly θ (theta).
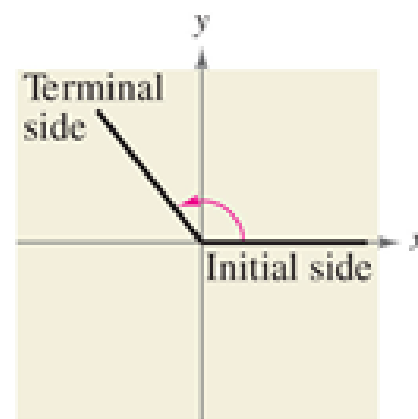
Angle in Standard Position

It is helpful to have some benchmark angles on the unit circle to help sketch angles.
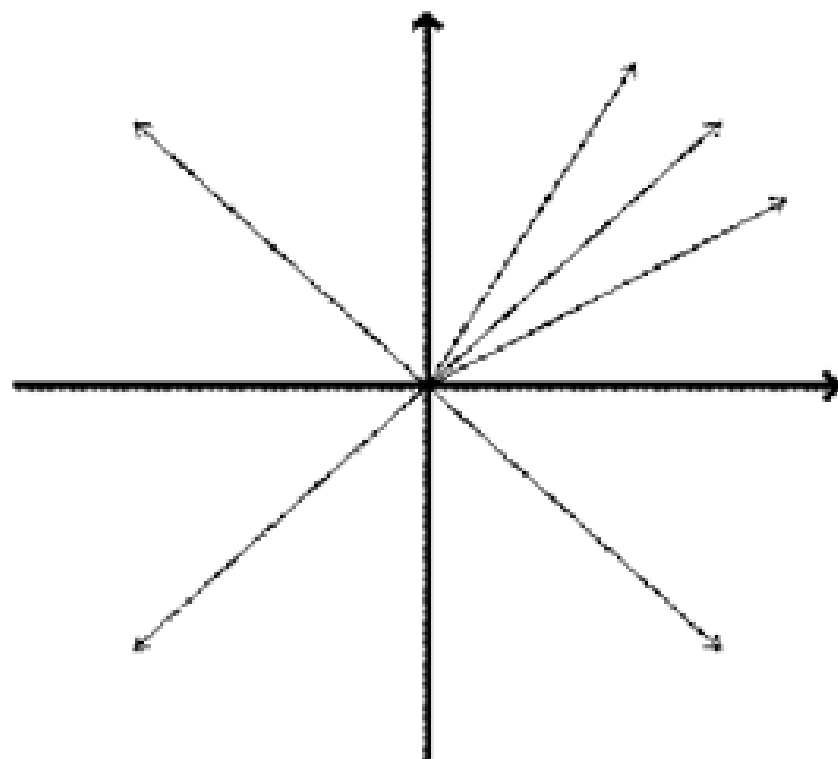
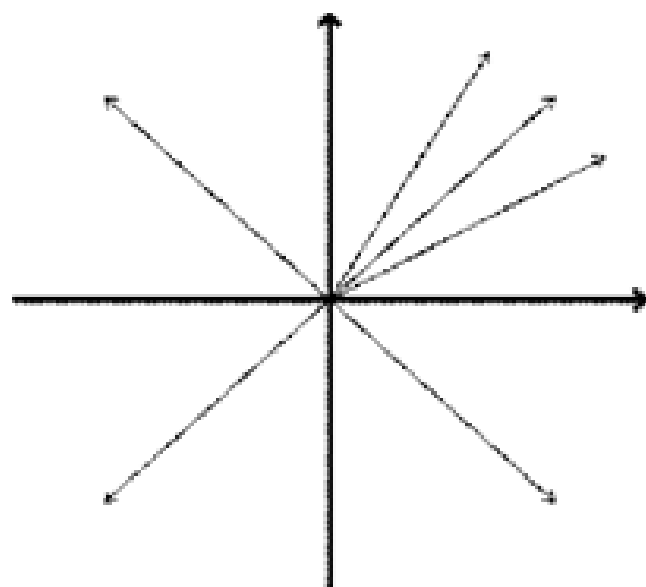$$\frac{\pi}{6} = 30° \qquad \frac{\pi}{4} = 45° \qquad \frac{\pi}{3} = 60° \qquad \frac{\pi}{2} = 90°$$

It is helpful to have some benchmark angles on the unit circle to help sketch angles.

$$\frac{\pi}{6} = 30° \qquad \frac{\pi}{4} = 45° \qquad \frac{\pi}{3} = 60° \qquad \frac{\pi}{2} = 90°$$

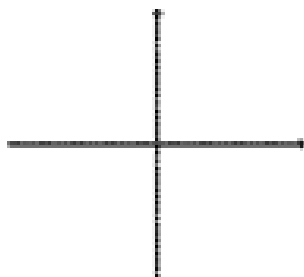$$\frac{3\pi}{4} = 135° \qquad \pi = 180° \qquad \frac{5\pi}{4} = 225°$$

$$\frac{3\pi}{2} = 270° \qquad \frac{7\pi}{4} = 315° \qquad 2\pi = 360°$$

Examples: Sketch each angle in standard position.

E. 50°

F. 210°
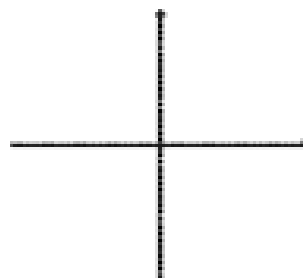
G. −45°
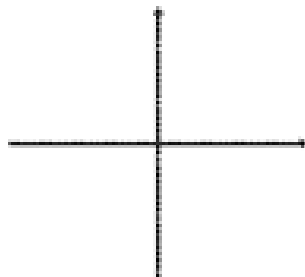
H. 630°
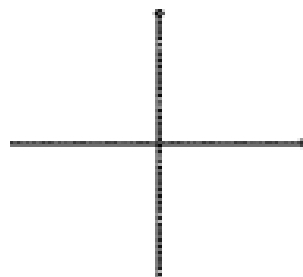
Examples: Sketch each angle in standard position.

I. $\dfrac{\pi}{2}$

J. $\dfrac{3\pi}{4}$

K. $\dfrac{13\pi}{6}$

L. $-\dfrac{\pi}{6}$
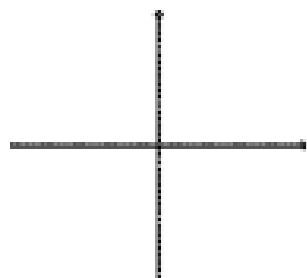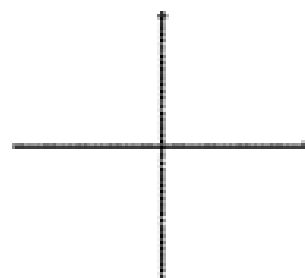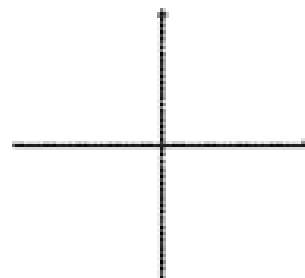
Angles with the same terminal side are called **coterminal**.
Coterminal angles are always 360° or 2π greater than or less
than each other (or multiples of 360° and 2π). There are
infinitely many coterminal angles for a given angle. Why?
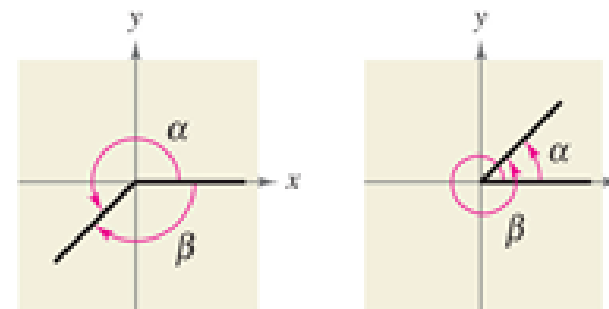
Examples: Find one positive and one negative coterminal angle.

M. 30°

N. −400°

Angles with the same terminal side are called **coterminal**. Coterminal angles are always 360° or 2π greater than or less than each other (or multiples of 360° and 2π). There are infinitely many coterminal angles for a given angle. Why?
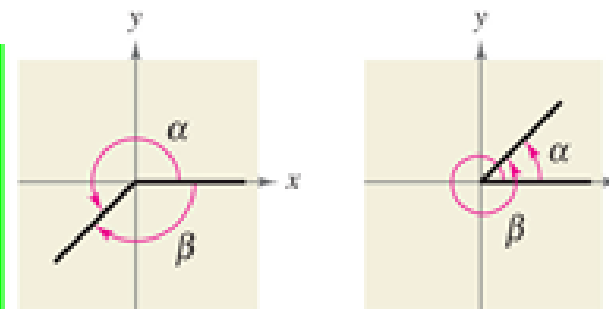

Examples: Find one positive and one negative coterminal angle.

O. $\dfrac{3\pi}{2}$

P. $-\pi$

By the end of the lesson, we will be able to:

- Convert Degrees to Radians

can you?

- Convert Radians to Degrees

- Understand and use the terms: Initial Side, Terminal Side, Standard Position, and Coterminal Side

Homework:

Assignment 50
&
Test Review 12