Example 1 Draw an Angle in Standard Position
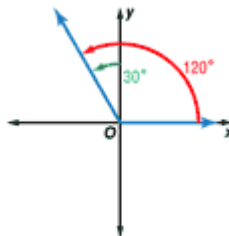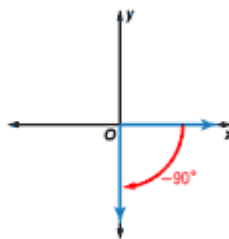
Draw an angle with the given measure in standard position.

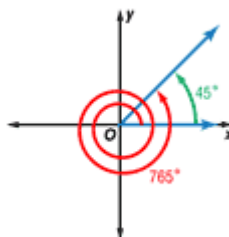**a. 120°**

$120° = 90° + 30°$. Draw the terminal side of the angle 30° counterclockwise past the positive *y*-axis.

b. –90°

The angle is negative. Draw the terminal side of the angle 90° clockwise from the positive *x*-axis.

c. 765°

$765° = 360° + 360° + 45°$. Draw the terminal side of the angle 45° counterclockwise past the positive *x*-axis.

Example 2 Convert Between Degree and Radian Measure

Rewrite each degree measure in radians and each radian measure in degrees.

a. –820°

$$-820° = -820° \left(\frac{\pi \text{ radians}}{180°} \right)$$

$$= \left(\frac{-820\pi}{180} \right) \text{ radians or } -\frac{41\pi}{9}$$

b. $\dfrac{25\pi}{3}$

$$\frac{25\pi}{3} = \left(\frac{25\pi}{3} \text{ radians} \right) \left(\frac{180°}{\pi \text{ radians}} \right)$$

$$= 1500°$$

Example 3 Measure an Angle in Degrees and Radians

ASTRONOMY The Moon rotates on its axis about once every 27 Earth days. Find both the degree and radian measures of the angle through which it passes in 9 days. (Assume the rotation is counterclockwise.)

The Moon rotates a complete rotation of 360˚ in 27 days, so it rotates $\frac{9}{27}$ or $\frac{1}{3}$ of 360° in 9 days.

$$\frac{1}{3}(360°) = 120°$$

The moon rotates a complete rotation that measures 2π radians in 27 days, so it rotates $\frac{9}{27}$ or $\frac{1}{3}$ of 2π in 9 days.

$$\frac{1}{3}(2\pi) = \frac{2\pi}{3}$$

So, the measure rotated by the Moon in 9 days is 120˚ or $\frac{2\pi}{3}$ radians.

Example 4 Coterminal Angles

Find one angle with positive measure and one angle with negative measure coterminal with each angle.

a. –250˚

A positive angle is –250˚ + 360˚ = 110˚.
A negative angle is –250˚ – 360˚ = –610˚.

b. $-\dfrac{\pi}{8}$

A positive angle is $-\dfrac{\pi}{8} + 2\pi$ or $\dfrac{15\pi}{8}$. $-\dfrac{\pi}{8} + \dfrac{16\pi}{8} = \dfrac{15\pi}{8}$

A negative angle is $-\dfrac{\pi}{8} - 2\pi$ or $-\dfrac{17\pi}{8}$. $-\dfrac{\pi}{8} - \dfrac{16\pi}{8} = -\dfrac{17\pi}{8}$