18 Angles and Their Measurement

Concepts:

- Angles
  - Initial Side and Terminal Side
  - Standard Position
  - Coterminal Angles
- Measuring Angles
  - Radian Measure vs. Degree Measure
  - Radian Measure as a Distance on the Unit Circle
  - Converting between Radian Measure and Degree Measure
  - Finding the Quadrant Associated with the Terminal Side of an Angle
- Identifying the Point on the Unit Circle that Corresponds to an Angle in Standard Position

(**Sections 6.1**)

1. Find the radian measure of each of the following:
   (a) $450°$ angle
   (b) $-50°$ angle
2. Show which of the following points must lie on the unit circle.
   (a) $(0, -1)$
   (b) $(1, -1)$
   (c) $(\frac{3}{5}, -\frac{4}{5})$
   (d) $(\frac{4}{5}, -\frac{3}{5})$
   (e) $(-\frac{\sqrt{5}}{3}, \frac{2}{3})$
   (f) $(\frac{\sqrt{3}}{2}, \frac{1}{2})$
   (g) $(-\frac{\sqrt{2}}{2}, \frac{\sqrt{3}}{2})$
   (h) $(\frac{1}{2}, -\frac{\sqrt{3}}{2})$

3. Suppose than an angle of measure θ radians intersects the unit circle at the point $\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$.
   (a) What is one possibility for θ ?
   (b) How do you find all the other possibilities?

4. Suppose than an angle of measure θ radians intersects the unit circle at the point $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$.
   (a) What is one possibility for θ?
   (b) How do you find all the other possibilities?

5. Suppose that an angle of measure θ radians is placed in standard position. Find the location of the terminal side of the angle.
   Possibilities: (A) Quadrant I, (B) Quadrant II, (C) Quadrant III, (D) Quadrant VI, (E) the positive x-axis, (F) the negative x-axis, (G) the positive y-axis, or (H) the negative y-axis.
   (a) $\theta = \frac{74\pi}{3}$
   (b) $\theta = -\frac{74\pi}{3}$
   (c) $\theta = 100\pi$
   (d) $\theta = -100\pi$
   (e) $\theta = 21\pi$
   (f) $\theta = -21\pi$
   (g) $\theta = \frac{102\pi}{7}$
   (h) $\theta = -\frac{102\pi}{7}$

6. Find the terminal point on the unit circle determined by the given value of θ.
   (a) $\theta = 4\pi$
   (b) $\theta = \frac{3\pi}{2}$
   (c) $\theta = -\frac{\pi}{6}$
   (d) $\theta = \frac{7\pi}{6}$
   (e) $\theta = -\frac{7\pi}{4}$
   (f) $\theta = \frac{5\pi}{3}$
   (g) $\theta = -\frac{4\pi}{3}$
   (h) $\theta = \frac{11\pi}{6}$