Lesson 11 Practice Problems

1. For which of these angles is the sine negative? Select **all** that apply.

   A. $-\frac{\pi}{4}$

   B. $-\frac{\pi}{3}$

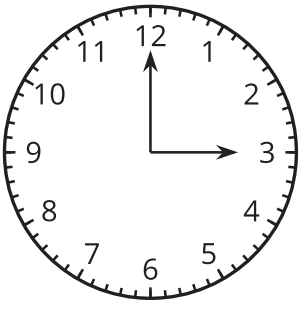
   C. $-\frac{2\pi}{3}$

   D. $-\frac{4\pi}{3}$

   E. $-\frac{11\pi}{6}$

2. The clock reads 3:00 p.m.

   Which of the following are true? Select **all** that apply.



   A. In the next hour, the minute hand moves through an angle of 2π radians.

   B. In the next 5 minutes, the minute hand will move through an angle of $-\frac{\pi}{6}$ radians.

   C. After the minute hand moves through an angle of $-\pi$ radians, it is 3:30 p.m.

   D. When the hour hand moves through an angle of $-\frac{\pi}{6}$ radians, it is 4:00 p.m.

   E. The angle the minute hand moves through is 12 times the angle the hour hand moves through.

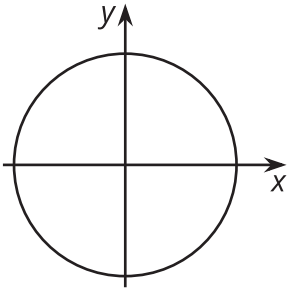
3. Plot each point on the unit circle.

   a. $A = (\cos(-\frac{\pi}{4}), \sin(-\frac{\pi}{4}))$

   b. $B = (\cos(2\pi), \sin(2\pi))$

   c. $C = \left(\cos(\frac{16\pi}{3}), \sin(\frac{16\pi}{3})\right)$

   d. $D = \left(\cos(-\frac{16\pi}{3}), \sin(-\frac{16\pi}{3})\right)$



4. Which of these statements are true about the function f given by $f(\theta) = \sin(\theta)$? Select **all** that apply.

   A. The graph of f meets the θ-axis at $0, \pm\pi, \pm 2\pi, \pm 3\pi, \ldots$

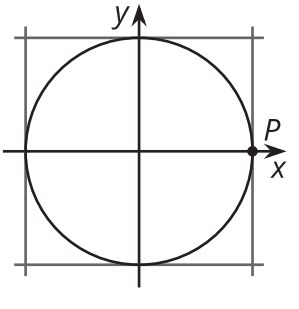
   B. The value of f always stays the same when π radians is added to the input.

   C. The value of f always stays the same when 2π radians is added to the input.

   D. The value of f always stays the same when -2π radians is added to the input.

   E. The graph of f has a maximum when $\theta = \frac{5\pi}{2}$ radians.

5. Here is a unit circle with a point P at $(1, 0)$.



   For each positive angle of rotation of the unit circle around its center listed, indicate on the unit circle where P is taken, and give a negative angle of rotation which takes P to the same location.

   a. A, $\frac{\pi}{4}$ radians

   b. B, $\frac{\pi}{2}$ radians

   c. C, π radians

   d. D, $\frac{3\pi}{2}$ radians

6. In which quadrant are both the sine and the tangent negative?

A. first

B. second

C. third

D. fourth

(From Unit 6, Lesson 6.)

7. *Technology required*. Each equation defines a function. Graph each of them to identify which are periodic. Select **all** that are.

   A. $y = \sin(\theta)$

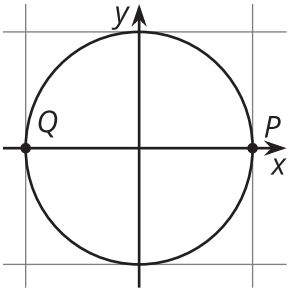
   B. $y = e^x$

   C. $y = x^2 - 2x + 5$

   D. $y = \cos(\theta)$

   E. $y = 3$

(From Unit 6, Lesson 8.)



8. a. List three different counterclockwise angles of rotation around the center of the circle that take P to Q.

   b. Which quadrant(s) are the angles $\frac{13\pi}{4}$ and $\frac{10\pi}{3}$ radians in? Is the sine of these angles positive or negative?

(From Unit 6, Lesson 10.)