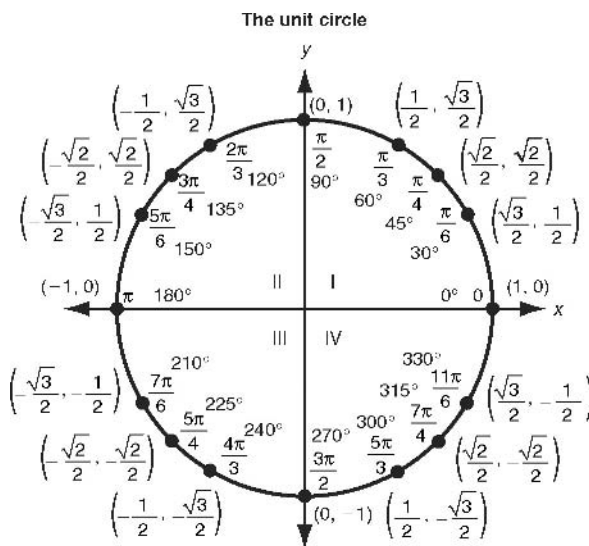
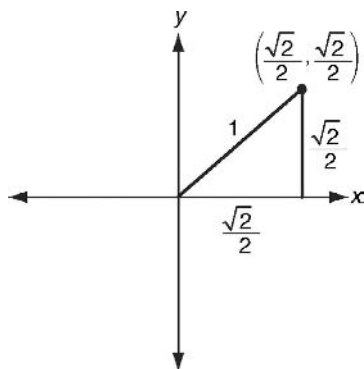


LESSON **Reading Strategies**

10-3 *Use a Visual Map*

The unit circle shown at right has a radius of 1 unit. So the terminal side of each angle has a length of 1 unit. As shown in the diagram below, that corresponds to the hypotenuse of a right triangle. The ordered pair shows the length of each side of the triangle. Notice the ordered pairs for the points at 0° , 90° , 180° , and 270° .



On the circle, for every value of θ ,

$$\sin \theta = \frac{y}{r} = \frac{y}{1} = y$$

$$\cos \theta = \frac{x}{r} = \frac{x}{1} = x$$

$$\tan \theta = \frac{y}{x}$$

Use the unit circle to answer each question.

1. Express 360° in radians. _____
2. What is $\sin 360^\circ$? _____
3. What is $\cos 360^\circ$? _____

4. a. In which quadrant does the terminal side of a 150° angle lie? _____
- b. Express 150° in radians. _____
- c. What point does the terminal side of an angle of 150° pass through on the unit circle? _____
- d. Which coordinate of the ordered pair represents $\sin 150^\circ$? _____
- e. Which coordinate of the ordered pair represents $\cos 150^\circ$? _____
- f. Write an expression for $\tan 150^\circ$ and simplify. _____

9. $\frac{\pi}{15}$ radians
10. 234°
11. $\frac{37\pi}{30}$ radians
12. $-\frac{7\pi}{12}$ radians
13. $-\frac{1}{2}; \frac{\sqrt{3}}{2}; -\frac{\sqrt{3}}{3}$
14. $-\frac{\sqrt{2}}{2}; \frac{\sqrt{2}}{2}; -1$
15. $-\frac{\sqrt{3}}{2}; -\frac{1}{2}; \sqrt{3}$
16. $\frac{1}{2}; -\frac{\sqrt{3}}{2}; -\frac{\sqrt{3}}{3}$
17. $-\frac{\sqrt{2}}{2}; -\frac{\sqrt{2}}{2}; 1$
18. $\frac{\sqrt{3}}{2}; \frac{1}{2}; -\sqrt{3}$
19. $\frac{\sqrt{2}}{2}; \frac{\sqrt{2}}{2}; 1$
20. $0; -1; 0$
21. $-\frac{1}{2}; -\frac{\sqrt{3}}{2}; -\frac{\sqrt{3}}{3}$
22. $-\frac{\sqrt{2}}{2}; \frac{\sqrt{2}}{2}; -1$
23. $-\frac{\sqrt{3}}{2}; \frac{1}{2}; -\sqrt{3}$
24. $\frac{\sqrt{2}}{2}; -\frac{\sqrt{2}}{2}; -1$
25. 138 ft

Review for Mastery

1. $-\frac{\pi}{4}$ radians
2. $\frac{5\pi}{6}$ radians
3. $\frac{7\pi}{6}$ radians
4. $-\frac{2\pi}{3}$ radians
5. 240°
6. -270°
7. 30°
8. 300°
9. 45°
10. $\sin 45^\circ = \frac{\sqrt{2}}{2}$
 $\cos 45^\circ = \frac{\sqrt{2}}{2}$
 $\tan 45^\circ = 1$
11. $\sin 315^\circ = -\frac{\sqrt{2}}{2}$
 $\cos 315^\circ = \frac{\sqrt{2}}{2}$
 $\tan 315^\circ = -1$

Challenge

1. 6080 ft
2. 1,600,921 mi; 66,705 mi/h

3. Area of circle = πr^2 ; A sector whose central angle has a measure of θ radians has an area of $\frac{\theta}{2\pi}$ times the area of the circle. So

$$\text{Area of sector} = \frac{\theta}{2\pi}(\pi r^2) = \frac{1}{2}\theta r^2.$$

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

Problem Solving

1. a. $r = \frac{\pi}{2}$
- b. $\theta = \frac{2\pi}{6}$ or $\frac{\pi}{3}$
- c. $S = r\theta = \frac{\pi}{2} \cdot \frac{\pi}{3} = \frac{\pi^2}{6}$
- d. 1.64 in.
- e. Yes; possible answer: because the arc length of the fragment is very close to the arc length that would be expected for a plate of diameter π

2. $\frac{1}{4}$
3. C
4. H
5. B
6. F

Reading Strategies

1. 2π
2. 0
3. 1
4. a. Quadrant II
- b. $\frac{5\pi}{6}$
- c. $\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$
- d. $\frac{1}{2}$
- e. $-\sqrt{\frac{3}{2}}$
- f. $\frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = -\frac{\sqrt{3}}{3}$