Name _____ Date _____ Class _____

LESSON 10-3

Practice C

The Unit Circle

Convert each measure from degrees to radians or from radians to degrees.

1. $-\frac{3\pi}{2}$ _____
2. $450°$ _____
3. $\frac{5\pi}{18}$ _____
4. $-200°$ _____
5. $\frac{7\pi}{4}$ _____
6. $-\frac{11\pi}{6}$ _____
7. $350°$ _____
8. $\frac{7\pi}{20}$ _____
9. $12°$ _____
10. $\frac{13\pi}{10}$ _____
11. $222°$ _____
12. $-105°$ _____

Find the exact value of the sine, cosine, and tangent of each angle.

13. $330°$ _____
14. $\frac{7\pi}{4}$ _____
15. $240°$ _____
16. $\frac{5\pi}{6}$ _____
17. $225°$ _____
18. $120°$ _____
19. $45°$ _____
20. $-\pi$ _____
21. $-\frac{5\pi}{6}$ _____
22. $-\frac{\pi}{4}$ _____
23. $-\frac{\pi}{3}$ _____
24. $135°$ _____

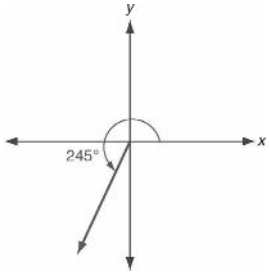
Solve.

25. A pendulum is 18 feet long. Its central angle is 44°. The pendulum makes one back and forth swing every 12 seconds. To the nearest foot, how far does the pendulum swing each minute?

_____

Reading Strategies

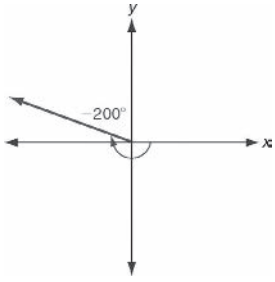
1. Possible answer: The angle is positive and measures between 180° and 270°.
2. Possible answer: The angle is negative and measures between –270° and –360°.
3. a.



   b. –115°

   c. 65°

4. a.



   b. 160°

   c. 20°

5. Yes; because you can find coterminal angles by either adding 360° to or subtracting 360° from the measure of the angle
6. Yes; because by definition, reference angles are the measure of the positive acute angle made by the terminal side of an angle and the *x*-axis.

10-3 THE UNIT CIRCLE

Practice A

1. $\frac{\pi}{3}$ radians
2. –72°
3. 150°
4. $\frac{7\pi}{4}$ radians
5. –135°
6. $-\frac{7\pi}{12}$ radians
7. 240°
8. –30°
9. $\frac{5\pi}{3}$ radians
10. $-\frac{\pi}{18}$ radians
11. 320°
12. a. $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ b. $\frac{\sqrt{3}}{2}$
13. $\frac{1}{2}$
14. 1
15. 0
16. $-\frac{1}{2}$
17. $-\frac{\sqrt{3}}{2}$
18. $\sqrt{3}$
19. 628 ft

Practice B

1. 75°
2. $\frac{43\pi}{36}$ radians
3. –290°
4. $-\pi$ radians
5. 300°
6. 210°
7. $\frac{20\pi}{9}$ radians
8. 54°
9. $\frac{7\pi}{36}$ radians
10. $-\frac{1}{2}$
11. 1
12. $-\frac{\sqrt{3}}{3}$
13. $-\frac{\sqrt{2}}{2}$
14. $-\frac{\sqrt{2}}{2}$
15. $\sqrt{3}$
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. $-\frac{1}{2}; \frac{\sqrt{3}}{2}; -\frac{\sqrt{3}}{3}$
20. $-\frac{\sqrt{3}}{2}; -\frac{1}{2}; \sqrt{3}$
21. $-\frac{\sqrt{2}}{2}; -\frac{\sqrt{2}}{2}; 1$
22. 2073 mi

Practice C

1. –270°
2. $\frac{5\pi}{2}$ radians
3. 50°
4. $-\frac{10\pi}{9}$ radians
5. 315°
6. –330°
7. $\frac{35\pi}{18}$ radians
8. 63°

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. $\sin 45° = \frac{\sqrt{2}}{2}$

    $\cos 45° = \frac{\sqrt{2}}{2}$

    $\tan 45° = 1$

11. $\sin 315° = -\frac{\sqrt{2}}{2}$

    $\cos 315° = \frac{\sqrt{2}}{2}$

    $\tan 315° = -1$

Challenge

1. 6080 ft

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

3. Area of circle $= \pi r^2$; 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 Area of sector $= \frac{\theta}{2\pi}\left(\pi r^2\right) = \frac{1}{2}\theta r^2$.

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. $\frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = -\frac{\sqrt{3}}{3}$