

LESSON

13-3

Practice B*The Unit Circle*

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

1. $\frac{5\pi}{12}$

2. 215°

3. $-\frac{29\pi}{18}$

4. -180°

5. $\frac{5\pi}{3}$

6. $-\frac{7\pi}{6}$

7. 400°

8. $\frac{3\pi}{10}$

9. 35°

Use the unit circle to find the exact value of each trigonometric function.

10. $\cos \frac{2\pi}{3}$

11. $\tan \frac{5\pi}{4}$

12. $\tan \frac{5\pi}{6}$

13. $\sin 315^\circ$

14. $\cos 225^\circ$

15. $\tan 60^\circ$

Use a reference angle to find the exact value of the sine, cosine, and tangent of each angle.

16. 150°

17. -225°

18. -300°

19. $\frac{11\pi}{6}$

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

21. $\frac{5\pi}{4}$

Solve.

22. San Antonio, Texas, is located about 30° north of the equator. If Earth's radius is about 3959 miles, approximately how many miles is San Antonio from the equator?

9. $\frac{5\pi}{3}$ radians 10. $-\frac{\pi}{18}$ radians 7. $\frac{35\pi}{18}$ radians 8. 63°
11. 320° 9. $\frac{\pi}{15}$ radians 10. 234°
12. a. $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ b. $\frac{\sqrt{3}}{2}$ 11. $\frac{37\pi}{30}$ radians 12. $-\frac{7\pi}{12}$ radians
13. $\frac{1}{2}$ 14. 1 13. $-\frac{1}{2}; \frac{\sqrt{3}}{2}; -\frac{\sqrt{3}}{3}$ 14. $-\frac{\sqrt{2}}{2}; \frac{\sqrt{2}}{2}; -1$
15. 0 16. $-\frac{1}{2}$ 15. $-\frac{\sqrt{3}}{2}; -\frac{1}{2}; \sqrt{3}$ 16. $\frac{1}{2}; -\frac{\sqrt{3}}{2}; -\frac{\sqrt{3}}{3}$
17. $-\frac{\sqrt{3}}{2}$ 18. $\sqrt{3}$ 17. $-\frac{\sqrt{2}}{2}; -\frac{\sqrt{2}}{2}; 1$ 18. $\frac{\sqrt{3}}{2}; -\frac{1}{2}; -\sqrt{3}$
19. 628 ft

Practice B

1. 75° 2. $\frac{43\pi}{36}$ radians 21. $-\frac{1}{2}; -\frac{\sqrt{3}}{2}; -\frac{\sqrt{3}}{3}$ 22. $-\frac{\sqrt{2}}{2}; \frac{\sqrt{2}}{2}; -1$
3. -290° 4. $-\pi$ radians 23. $-\frac{\sqrt{3}}{2}; \frac{1}{2}; -\sqrt{3}$ 24. $\frac{\sqrt{2}}{2}; -\frac{\sqrt{2}}{2}; -1$
5. 300° 6. 210° 25. 138 ft
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°

Reteach

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