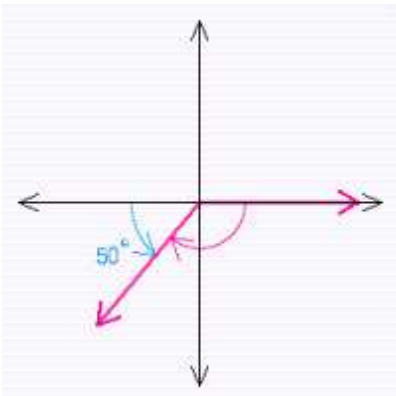


Multiple Choice

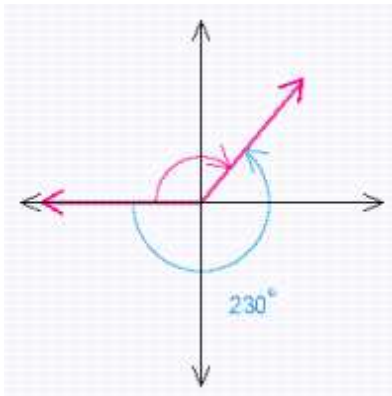
____ 1. Draw the following angle in standard position and then name the reference angle.

130°

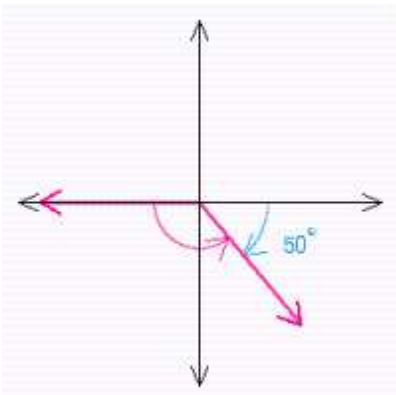
a.



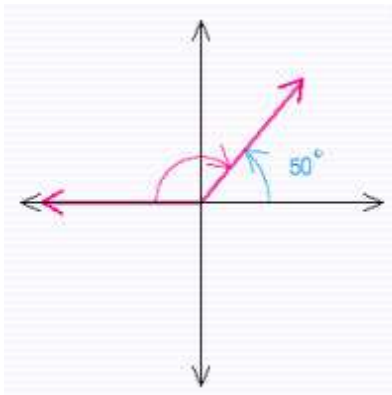
d.



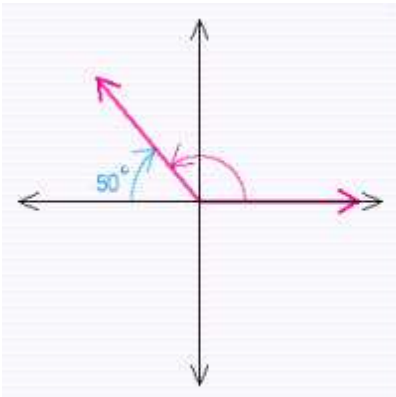
b.



e.



c.



_____ 2. Find the exact value of $\tan 420^\circ$.

- a. $-\frac{\sqrt{3}}{2}$
- b. $\sqrt{3}$
- c. $-\frac{\sqrt{3}}{3}$
- d. $-\sqrt{3}$
- e. $\frac{\sqrt{3}}{2}$

_____ 3. Use a calculator to find $\cos 337^\circ$.

Please round the answer to the nearest thousandth.

- a. 0.918
- b. 0.951
- c. 0.921
- d. 0.931
- e. 0.943

_____ 4. Use a calculator to find $\tan 143.3^\circ$.

Please round the answer to the nearest ten-thousandth.

- a. -0.7354
- b. -0.7254
- c. -0.7454
- d. -0.7564
- e. -0.7457

_____ 5. Use a calculator to find θ to the nearest tenth of a degree, if $0^\circ < \theta < 360^\circ$ and $\cot \theta = -0.7364$ with θ in QII.

- a. 125.4°
- b. 126.4°
- c. 123.4°
- d. 129.9°
- e. 128.7°

- _____ 6. Find the radian measure of angle θ , if θ is a central angle in a circle of radius r , and θ cuts off an arc of length s .

$$r = \frac{1}{10} \text{ cm}, s = \frac{1}{2} \text{ cm}$$

- a. $\frac{1}{4}$
- b. 5
- c. 4
- d. $\frac{\pi}{5}$
- e. $\frac{1}{5}$

- _____ 7. Convert to radian measure using exact values.

$$\theta = 320^\circ$$

- a. $\frac{16\pi}{9}$
- b. $\frac{10\pi}{9}$
- c. $\frac{7\pi}{6}$
- d. $\frac{17\pi}{9}$
- e. $\frac{3\pi}{2}$

- _____ 8. Use a calculator to convert $130^\circ 50'$ to radians. Round your answer to the nearest hundredth. (First convert to decimal degrees, then multiply by the appropriate conversion factor to convert to radians.)

- a. 2.28
- b. 2.26
- c. 2.32
- d. 2.20
- e. 2.34

_____ 9. Label the reference angle in both degrees and radians.

$$\theta = \frac{7\pi}{3}$$

a. $90^\circ = \frac{\pi}{2}$

b. $30^\circ = \frac{\pi}{6}$

c. $30^\circ = \frac{\pi}{3}$

d. $60^\circ = \frac{\pi}{6}$

e. $60^\circ = \frac{\pi}{3}$

_____ 10. Evaluate the expression when x is $\frac{\pi}{6}$. Use exact values.

$$5 \cos 6x$$

a. 0

b. 8

c. -8

d. -5

e. 5

_____ 11. Use the unit circle to find the six trigonometric functions of $\frac{7\pi}{6}$.

a. $\sin \frac{7\pi}{6} = -\frac{1}{2}, \quad \cos \frac{7\pi}{6} = -\frac{\sqrt{3}}{2}, \quad \tan \frac{7\pi}{6} = \frac{\sqrt{3}}{3}$
 $\cot \frac{7\pi}{6} = \sqrt{3}, \quad \sec \frac{7\pi}{6} = -2, \quad \csc \frac{7\pi}{6} = -\frac{2\sqrt{3}}{3}$

b. $\sin \frac{7\pi}{6} = -\frac{1}{2}, \quad \cos \frac{7\pi}{6} = -\frac{\sqrt{3}}{2}, \quad \tan \frac{7\pi}{6} = \frac{\sqrt{3}}{3}$
 $\cot \frac{7\pi}{6} = \sqrt{3}, \quad \sec \frac{7\pi}{6} = -\frac{2\sqrt{3}}{3}, \quad \csc \frac{7\pi}{6} = -2$

c. $\sin \frac{7\pi}{6} = -\frac{1}{2}, \quad \cos \frac{7\pi}{6} = -\frac{\sqrt{3}}{2}, \quad \tan \frac{7\pi}{6} = \sqrt{3}$
 $\cot \frac{7\pi}{6} = \frac{\sqrt{3}}{3}, \quad \sec \frac{7\pi}{6} = -\frac{2\sqrt{3}}{3}, \quad \csc \frac{7\pi}{6} = -2$

d. $\sin \frac{7\pi}{6} = -\frac{\sqrt{3}}{2}, \quad \cos \frac{7\pi}{6} = -\frac{1}{2}, \quad \tan \frac{7\pi}{6} = \sqrt{3}$
 $\cot \frac{7\pi}{6} = \frac{\sqrt{3}}{3}, \quad \sec \frac{7\pi}{6} = -\frac{2\sqrt{3}}{3}, \quad \csc \frac{7\pi}{6} = -2$

e. $\sin \frac{7\pi}{6} = -\frac{\sqrt{3}}{2}, \quad \cos \frac{7\pi}{6} = -\frac{1}{2}, \quad \tan \frac{7\pi}{6} = \frac{\sqrt{3}}{3}$
 $\cot \frac{7\pi}{6} = \sqrt{3}, \quad \sec \frac{7\pi}{6} = -\frac{2\sqrt{3}}{3}, \quad \csc \frac{7\pi}{6} = -2$

_____ 12. Use the unit circle to find all values of θ between 0 and 2π for which $\sin \theta = \frac{\sqrt{3}}{2}$.

a. $\frac{\pi}{6}, \frac{11\pi}{6}$

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

c. $\frac{5\pi}{6}, \frac{7\pi}{6}$

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

e. $\frac{7\pi}{6}, \frac{11\pi}{6}$

- _____ 13. Graph the unit circle using parametric equations with your calculator set to degree mode. Use a scale of 5. Trace the circle to find the sine and cosine of the angle to the nearest ten-thousandth.

$$255^\circ$$

- a. $\sin 255^\circ = -0.9659$; $\cos 255^\circ = 0.2338$
- b. $\sin 255^\circ = -0.9409$; $\cos 255^\circ = -0.2338$
- c. $\sin 255^\circ = -0.9409$; $\cos 255^\circ = -0.2588$
- d. $\sin 255^\circ = -0.9659$; $\cos 255^\circ = -0.2588$
- e. $\sin 255^\circ = -0.9659$; $\cos 255^\circ = -0.2338$

- _____ 14. Graph the unit circle using parametric equations with your calculator set to degree mode. Use a scale of 5. Trace the circle to find all values of t between 0° and 360° satisfying the statement.

$$\cos t = -\frac{1}{2}$$

- a. $210^\circ, 300^\circ$
- b. $125^\circ, 235^\circ$
- c. $120^\circ, 300^\circ$
- d. $210^\circ, 240^\circ$
- e. $120^\circ, 240^\circ$

- _____ 15. Graph the unit circle using parametric equations with your calculator set to degree mode. Use a scale of 5. Trace the circle to find all values of t between 0° and 360° satisfying the statement.

$$-\sin t = \cos t$$

- a. $135^\circ, 315^\circ$
- b. $145^\circ, 305^\circ$
- c. $135^\circ, 320^\circ$
- d. $140^\circ, 320^\circ$
- e. $140^\circ, 315^\circ$

- _____ 16. For the problem below, θ is a central angle in a circle of radius r . Find the length of arc s cut off by θ .

$$\theta = 5, r = 4 \text{ inches}$$

- a. $s = 33.3$ inches
- b. $s = 20$ inches
- c. $s = 10.1$ inches
- d. $s = 17$ inches
- e. $s = 24$ inches

___ 17. For the problem below, θ is a central angle in a circle of radius r . Find the length of arc s cut off by θ .

$\theta = 25^\circ$, $r = 6$ mm

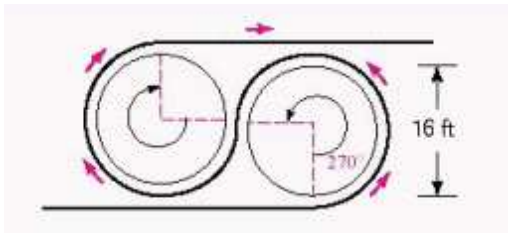
- a. $s = 2.72$ mm
- b. $s = 7$ mm
- c. $s = 2.62$ mm
- d. $s = 2.42$ mm
- e. $s = 4$ mm

___ 18. **Arc length** The minute hand of a clock is 1.1 centimeters long. How far does the tip of the minute hand travel in 20 minutes?

Round to three significant digits.

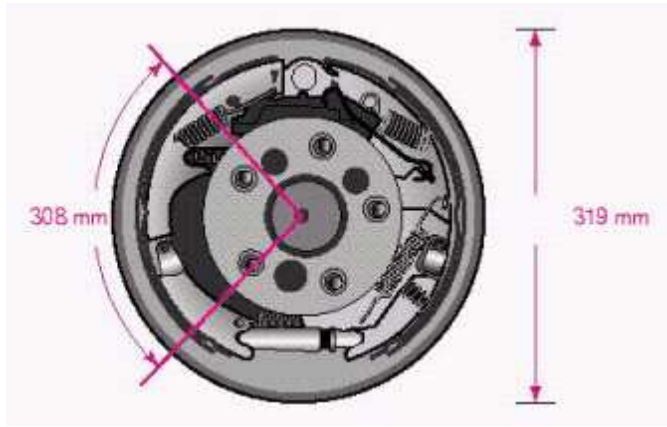
- a. 2.00 centimeters
- b. 2.10 centimeters
- c. 2.20 centimeters
- d. 2.30 centimeters
- e. 2.70 centimeters

___ 19. The current San Francisco cable railway is driven by two large 16-foot-diameter drive wheels, called sheaves. Because of the figure-eight system used, the cable subtends a central angle of 270° on each sheave. Find the length of cable riding on one of the drive sheaves at any given time.

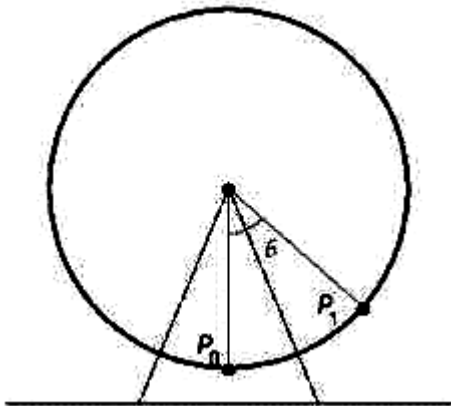


- a. 40.7 feet
- b. 35.7 feet
- c. 33.7 feet
- d. 38.7 feet
- e. 37.7 feet

20. A light truck with manual transmission has a circular brake drum with a diameter of 319 millimeters. Each brake pad, which presses against the drum, is 308 millimeters long. What central angle is subtended by one of the brake pads? Write your answer in both radians and in degrees.



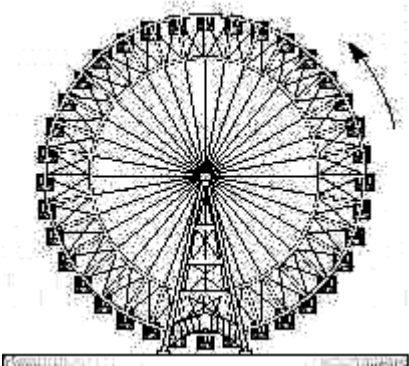
- a. 1.53 radians, 107°
 b. 1.63 radians, 108°
 c. 1.83 radians, 112°
 d. 1.93 radians, 111°
 e. 1.73 radians, 113°
21. The figure is a model of George Ferris's Ferris wheel. The diameter of the wheel is 240 feet; and θ is the central angle formed as a rider travels from his or her initial position P_0 to position P_1 . Find the distance traveled by the rider if $\theta = 212^\circ$.



- a. 445.0 ft
 b. 442.0 ft
 c. 448.0 ft
 d. 444.0 ft
 e. 447.0 ft

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- _____ 22. Find the area of the sector formed by central angle $\theta = 2.3$ in a circle of radius $r = 6$ inches.
- 41.2 inches²
 - 41.5 inches²
 - 41.1 inches²
 - 41.4 inches²
 - 41 inches²
- _____ 23. Find the linear velocity of a point moving with uniform circular motion, if the point covers a distance s in an amount of time t , where $s = 16$ cm and $t = 2$ sec.
- 7 cm/sec
 - 8 cm/sec
 - 11.2 cm/sec
 - 10.8 cm/sec
 - 12 cm/sec
- _____ 24. Point P moves with angular velocity ω on a circle of radius r . Find the distance s traveled by the point in time t .
- $$\omega = \frac{3\pi}{2} \text{ rad/sec}, r = 4 \text{ m}, t = 25 \text{ sec}$$
- 531 m
 - 638 m
 - 471 m
 - 213 m
 - 794 m
- _____ 25. The figure below is a model of the Ferris wheel. The diameter of the wheel is 185 feet, and one complete revolution takes 15 minutes. Find the linear velocity of a person riding on the wheel. Give your answer in miles per hour and round to the nearest hundredth.



- 0.44 mph
- 0.24 mph
- 0.61 mph
- 0.39 mph
- 0.35 mph

Answer Section

MULTIPLE CHOICE

1. C
2. B
3. C
4. C
5. B
6. B
7. A
8. A
9. E
10. D
11. B
12. D
13. D
14. E
15. A
16. B
17. C
18. D
19. E
20. D
21. D
22. D
23. B
24. C
25. A