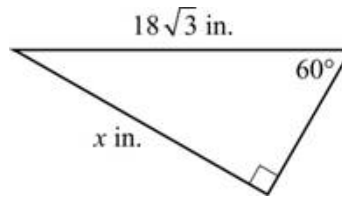


Name: _____

Date: _____

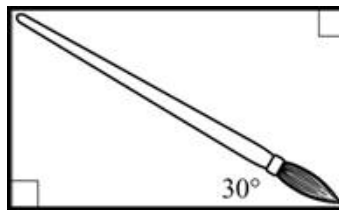
1. This triangle has the dimensions shown.



What is the value of x ?

- A. $9\sqrt{3}$
- B. $9\sqrt{6}$
- C. 18
- D. 27

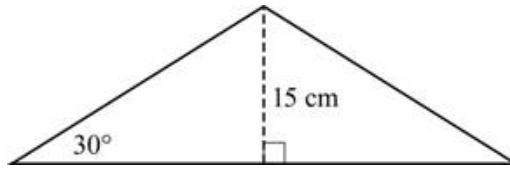
2. A 10-inch paintbrush fits exactly in the rectangular base of a box when placed diagonally, as shown in this diagram.



What is the area of the base of the box?

- A. 25 sq. in.
- B. $25\sqrt{3}$ sq. in.
- C. 50 sq. in.
- D. $50\sqrt{3}$ sq. in.

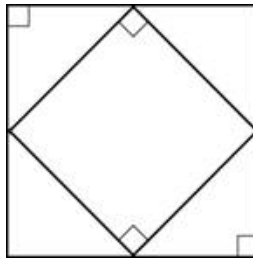
3. The altitude of this isosceles triangle is 15 centimeters, as shown.



What is the perimeter, to the nearest centimeter, of the isosceles triangle?

- A. 90 cm
 - B. 96 cm
 - C. 112 cm
 - D. 120 cm
-

4. A small square is inscribed inside a large square, as shown in this figure.



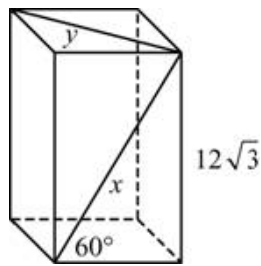
The perimeter of the large square is 64 meters. What is the AREA of the small square?

- A. 64 m^2
 - B. 128 m^2
 - C. 320 m^2
 - D. 512 m^2
-

5. The length of a diagonal of one face of a cube is 4 feet. What is the volume, to the nearest cubic foot, of the cube?

- A. 16 cu. ft.
 - B. 23 cu. ft.
 - C. 64 cu. ft.
 - D. 181 cu. ft.
-

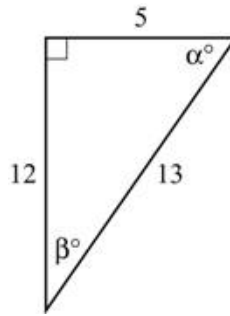
6. The bases of this rectangular prism are squares.



Which expression represents the value $x - y$?

- A. $12\sqrt{2} - 12$
 - B. $12\sqrt{6} - 12$
 - C. $24 - 12\sqrt{2}$
 - D. $24 - 12\sqrt{6}$
-

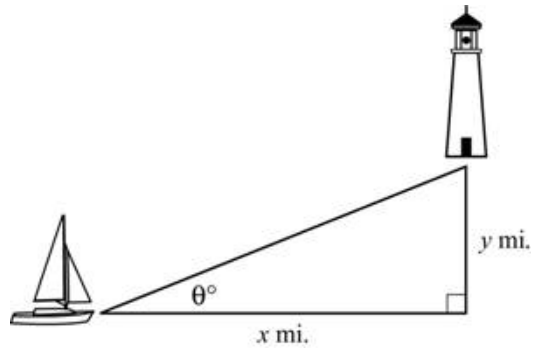
7. This triangle has the measures shown.



Which measures shown in the triangle are equivalent to $\frac{5}{13}$?

- A. $\sin a$ only
 - B. $\cos b$ only
 - C. $\sin a$ and $\cos b$
 - D. $\cos a$ and $\sin b$
-

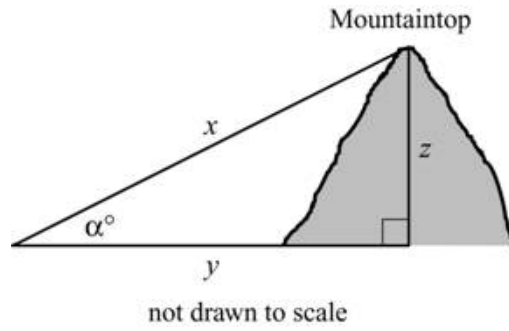
8. This diagram represents the distance between a boat and a lighthouse.



Based on the diagram, which equation must be true?

- A. $\sin \theta = \frac{x}{y}$
 - B. $\sin \theta = \frac{y}{x}$
 - C. $\tan \theta = \frac{x}{y}$
 - D. $\tan \theta = \frac{y}{x}$
-

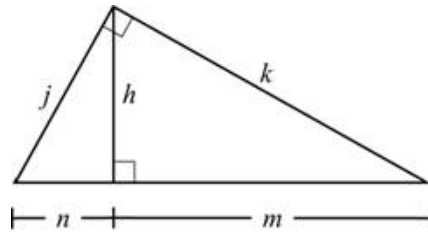
9. The tangent of α in this diagram is $\frac{7}{24}$.



The height of the mountain, z , is 1400 feet. Which equation must be true?

- A. $x = 1200$ feet
 - B. $y = 1200$ feet
 - C. $x = 4800$ feet
 - D. $y = 4800$ feet
-

10. This diagram shows similar right triangles.



Which equation must be true?

A. $\frac{h}{k} = \frac{j}{n}$

B. $\frac{m}{k} = \frac{h}{n}$

C. $\frac{h}{k} = \frac{j}{n+m}$

D. $\frac{m}{k} = \frac{h}{n+m}$

11. The measure of $\angle Z$ in right $\triangle XYZ$ is 90° . Which equation must be true?

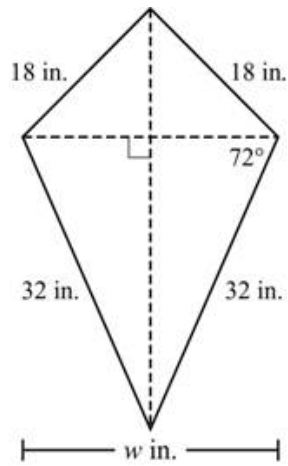
A. $\sin \angle X = \sin \angle Y$

B. $\sin \angle X = \cos \angle Y$

C. $\sin \angle X + \sin \angle Y = 1$

D. $\sin \angle X + \cos \angle Y = 1$

12. This diagram shows the lengths of each side of a kite.

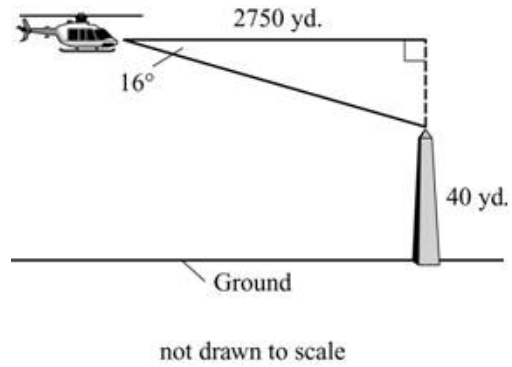


What is the value of w , to the nearest inch?

$$\left[\begin{array}{l} \sin 72^\circ = 0.9511 \\ \cos 72^\circ = 0.3090 \\ \tan 72^\circ = 3.0777 \end{array} \right]$$

- A. 10 in
 - B. 20 in
 - C. 30 in
 - D. 40 in
-

13. The angle of depression from a helicopter to the top of a monument is 16° , as shown in this diagram.

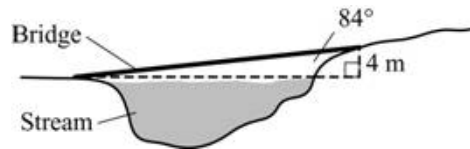


How far above the ground, to the nearest yard, is the helicopter?

$$\left[\begin{array}{l} \sin 16^\circ = 0.2756 \\ \cos 16^\circ = 0.9613 \\ \tan 16^\circ = 0.2867 \end{array} \right]$$

- A. 798 yd.
 - B. 828 yd.
 - C. 2684 yd.
 - D. 2860 yd.
-

14. A bridge is built across a stream as shown in this diagram.



The top of the bridge is 4 meters above the stream. Which equation can be used to find x , the length, in meters, of the bridge?

A. $\sin 84^\circ = \frac{4}{x}$

B. $\sin 84^\circ = \frac{x}{4}$

C. $\cos 84^\circ = \frac{4}{x}$

D. $\tan 84^\circ = \frac{x}{4}$

15. A building casts a 50-foot shadow. The angle of elevation from the end of the shadow to the top of the building is 69° .

What is the height, to the nearest foot, of the building?

$$\left[\begin{array}{l} \sin 69^\circ = 0.9336 \\ \cos 69^\circ = 0.3584 \\ \tan 69^\circ = 2.6051 \end{array} \right]$$

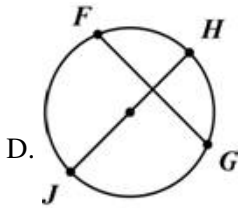
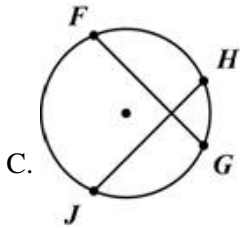
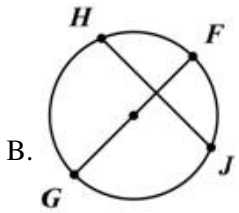
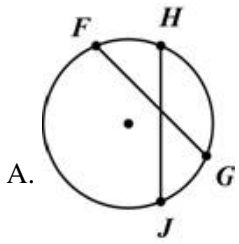
A. 19 ft.

B. 47 ft.

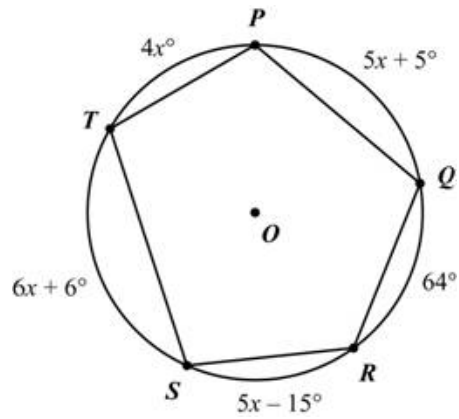
C. 54 ft.

D. 130 ft.

16. The perpendicular bisector of chord \overline{FG} is chord \overline{HJ} . Which diagram shows chords \overline{FG} and \overline{HJ} ?



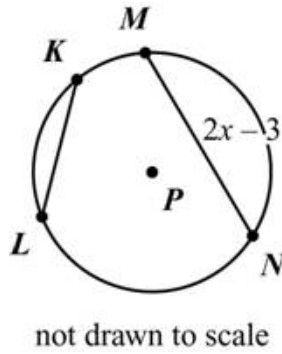
17. Polygon $PQRST$ is inscribed inside circle O , as shown.



Which two sides of polygon $PQRST$ are congruent?

- A. \overline{PQ} and \overline{RS}
 - B. \overline{PQ} and \overline{ST}
 - C. \overline{PT} and \overline{QR}
 - D. \overline{PT} and \overline{RS}
-

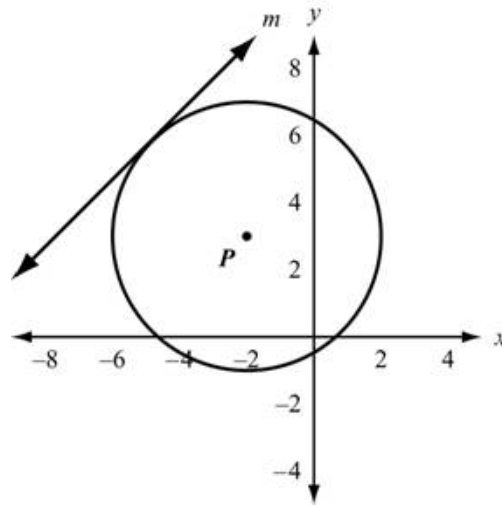
18. Chords \overline{KL} and \overline{MN} are equidistant from center P in this circle.



Chord \overline{KL} is 6 units long. Which statement **MUST** be true about the value of x ?

- A. It is 1.5.
 - B. It is between 1.5 and 4.5.
 - C. It is 4.5.
 - D. It is greater than 4.5.
-

19. The center of circle P is located at $(-2, 3)$, as shown on this coordinate plane.



Line m is tangent to circle P at $(-5, 6)$.

What is the equation of line m ?

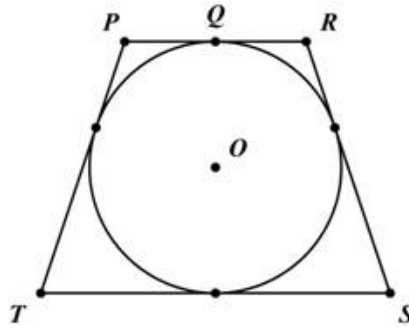
A. $y = x + 9$

B. $y = x + 11$

C. $y = \frac{1}{2}x + 9$

D. $y = \frac{1}{2}x + 11$

20. Circle O is inscribed inside quadrilateral $PRST$, as shown in this diagram.



~~_____~~ \overline{PR} is tangent to circle O at point Q .

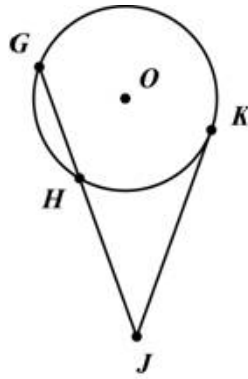
~~_____~~ $PQ = 7$ inches

~~_____~~ $RS = 20$ inches

What is the perimeter of quadrilateral $PRST$?

- A. 80 in.
 - B. 74 in.
 - C. 68 in.
 - D. 54 in.
-

21. Segment GJ is a secant to circle O , as shown.

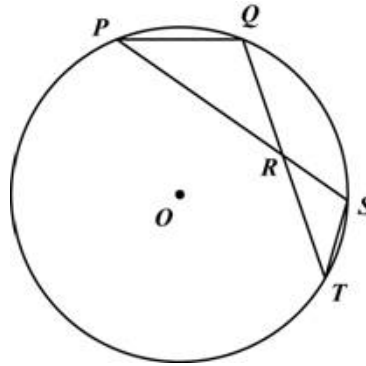


not drawn to scale

Segment JK is a tangent to circle O . Which statement **MUST** be true?

- A. Vertices G , K , and J form a right triangle.
 - B. Vertices K , J , and O form a right triangle.
 - C. Vertices G , K , and J form an obtuse triangle.
 - D. Vertices K , J , and O form an obtuse triangle.
-

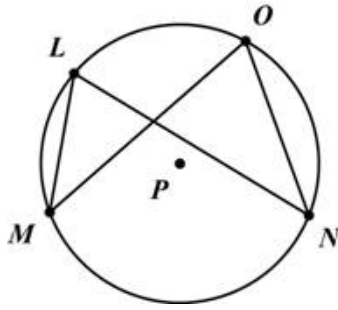
22. The measure of $\angle QPR$ is 35° in this circle.



The measure of $\angle RST$ is 109° . What is the measure of $\angle PRT$?

- A. 74°
 - B. 90°
 - C. 109°
 - D. 144°
-

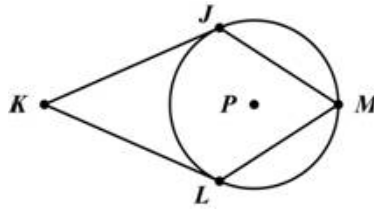
23. Points L , M , N , and O lie on circle P , as shown.



Which measure **MUST** be equivalent to $m\angle LMO$?

- A. $m\angle LNO$
 - B. $m\angle MON$
 - C. $\frac{1}{2}m\angle LNO$
 - D. $\frac{1}{2}m\angle MON$
-

24. Segments KJ and KL are tangent to circle P .

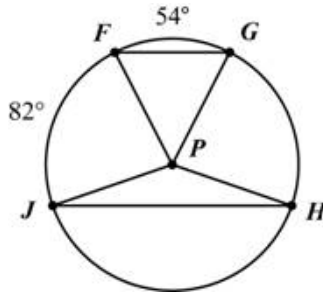


- Point M lies on circle P .
- $m\angle JML = 40^\circ$

What is the measure of $\angle JKL$?

- A. 140°
 - B. 100°
 - C. 80°
 - D. 50°
-

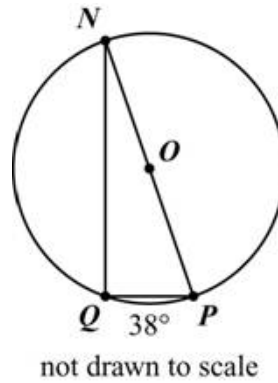
25. This diagram shows circle P with $\overline{FG} \parallel \overline{JH}$.



What is the measure of $\angle JPH$?

- A. 108°
 - B. 136°
 - C. 142°
 - D. 164°
-

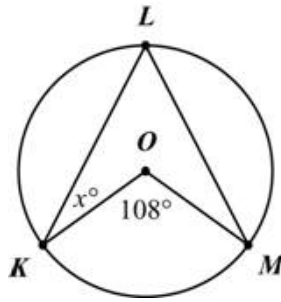
26. Points N , P , and Q lie on circle O , as shown in this diagram.



The measure of \widehat{QP} is 38° . What is the measure of $\angle NPQ$?

- A. 76°
 - B. 71°
 - C. 52°
 - D. 38°
-

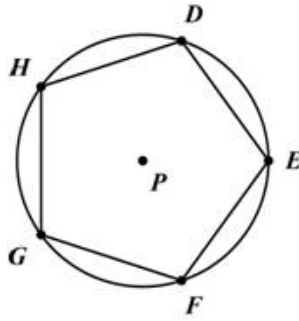
27. Chord \overline{KL} is congruent to chord \overline{LM} in circle O , as shown.



What is the value of x ?

- A. 54
 - B. 36
 - C. 27
 - D. 24
-

28. Regular pentagon $DEFGH$ is inscribed in circle P , as shown.



The length of \widehat{DEF} is 8π yards.

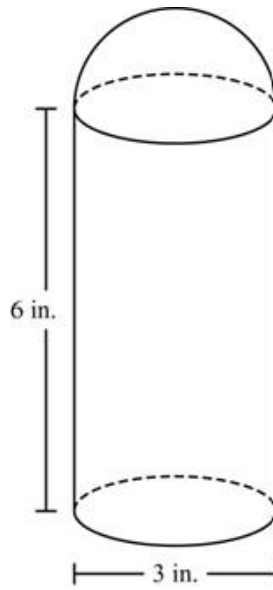
Which equation must be true?

- A. $PD = 4$ yd.
- B. $DF = 8$ yd.
- C. $PG = 10$ yd.
- D. $HE = 20$ yd.

29. An exercise ball has a volume of 2304π cubic inches. What is the surface area of the ball?

- A. 96π q. in.
- B. 192π q. in.
- C. 288π q. in.
- D. 576π q. in.

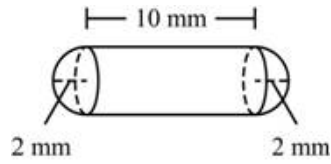
30. The body of this container is in the shape of a cylinder.



The top of the container is in the shape of half a sphere. What is the approximate amount of space inside the container?

- A. 49.5 cu. in.
 - B. 56.5 cu. in.
 - C. 226.2 cu. in.
 - D. 282.7 cu. in.
-

31. The vitamin represented in this diagram is in the shape of a cylinder with a half of a sphere on each end.



What is the volume, to the nearest cubic millimeter, of the vitamin?

- A. 193 mm³
- B. 159 mm³
- C. 142 mm³
- D. 126 mm³

Answer Key

1. D) 27

2. B) $25\sqrt{3}$ sq. in.

3. C) 112 cm

4. B) 128 m^2

5. B) 23 cu. ft.

6. C) $24 - 12\sqrt{2}$

7. D) $\cos a$ and $\sin b$

8. D) $\tan \theta = \frac{y}{x}$

9. D) $y = 4800$ feet

10. C) $\frac{k}{c} = \frac{j}{m+m}$

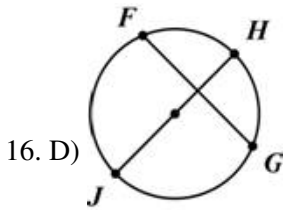
11. B) $\sin \angle X = \cos \angle Y$

12. B) 20 in

13. B) 828 yd.

14. C) $\cos 84^\circ = \frac{4}{x}$

15. D) 130 ft.



17. D) \overline{PT} and \overline{RS}

18. C) It is 4.5.

19. B) $y = x + 11$

20. A) 80 in.

21. B) Vertices K , J , and O form a right triangle.

22. D) 144°

23. A) $m\angle LNO$

24. B) 100°

25. C) 142°

26. B) 71°

27. C) 27

28. C) $PG = 10$ yd.

29. D) 576π in.

30. A) 49.5 cu. in.

31. B) 159 mm^3