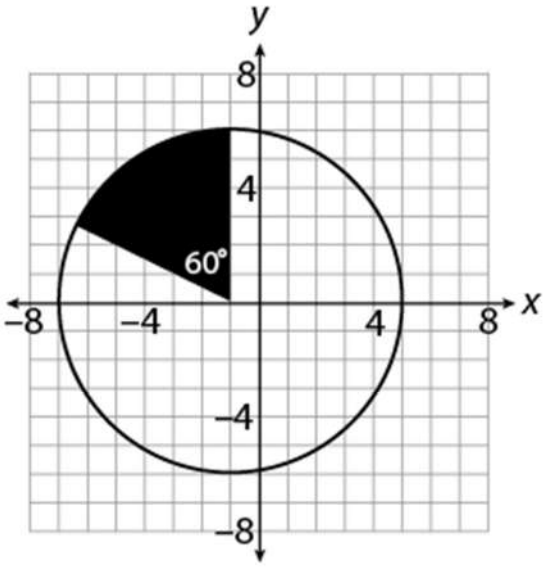
Advanced Geometry, Trigonometry Practice

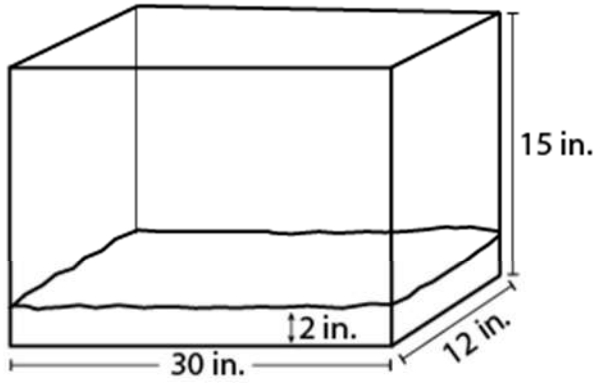
1.



What is the area of the shaded sector of the circle shown in the figure above?

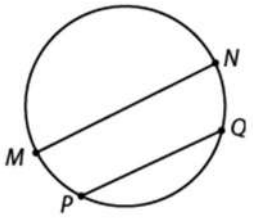
Ⓐ 2π
Ⓑ 6π
Ⓒ 12π
Ⓓ 36π

2.



The figure above shows a fish tank with sand in the bottom. If the water level is to be 3 inches below the top, how many cubic inches of water are needed to fill the tank?

3.



The circle shown has a radius of r centimeters. If chord PQ is parallel to diameter MN, and the length of chord PQ is $\frac{3}{4}$ of the length of the diameter, what is the distance in centimeters between chords MN and PQ in terms of r?

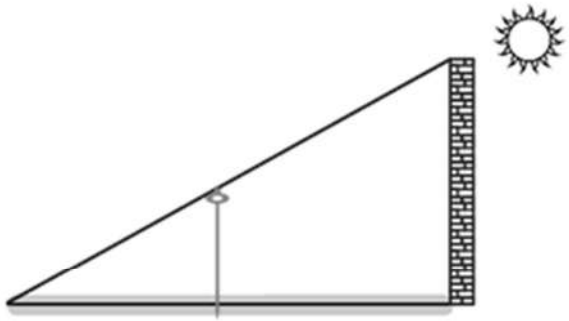
Ⓐ $\frac{\sqrt{7}}{4}r$

Ⓑ $\frac{\sqrt{3}}{2}r$

Ⓒ $\frac{1}{4}\pi r$

Ⓓ $\frac{3}{4}\pi r$

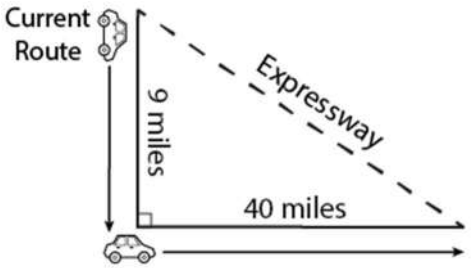
4.



Note: Figure not drawn to scale.

A toy saber is stuck at a right angle into the ground 4 inches deep. It casts a shadow that is 4 feet long. The brick wall casts a shadow three times that long. If the wall is 7 feet 6 inches tall, how many inches long is the toy saber?

5. Calculator

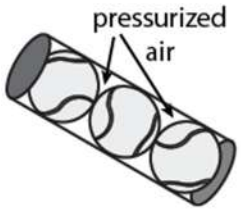


Note: Figure not drawn to scale.

The figure above shows the route that Max currently takes to work and back home every day. The city is planning to build an expressway that would cross through the city to help alleviate commuter traffic. Assuming an average gas consumption of 20 miles per gallon and a 5-day workweek, how many gallons of gas will Max save per week by taking the expressway to and from work each day instead of using his current route?

Ⓐ 2
Ⓑ 4
Ⓒ 8
Ⓓ 10.25

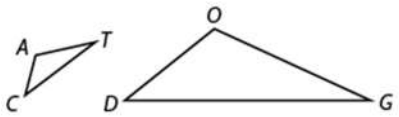
6. Calculator



Higher-quality tennis balls are typically packaged in cylindrical cans, as shown above, which are pressurized with air to keep them fresh. If the can and the tennis balls have the same diameter, 2.6 inches, what is the volume in cubic inches of the air inside the can around the tennis balls? Assume that each tennis ball is tangent to the next and that the top and bottom tennis balls are tangent to the top and bottom of the can.

Ⓐ 4.4π
Ⓑ 8.1π
Ⓒ 10.3π
Ⓓ 29.3π

7.



Note: Figure not drawn to scale.

Note: Figure not drawn to scale. If triangle *CAT* shown above is similar to triangle *DOG*, and the ratio of the length of side *TC* to side *GD* is 2:7, which of the following ratios must also be equal to 2:7?

Ⓐ $\overline{CA} : \overline{DG}$
Ⓑ $m\angle C : m\angle D$
Ⓒ area of ΔCAT : area of ΔDOG
Ⓓ perimeter of ΔCAT : perimeter of ΔDOG