Pythagorean Theorem

MGSE8.G.6 – Pythagorean Theorem Proof
MGSE8.G.7 – Pythagorean Theorem in Various Contexts
MGSE8.G.8 – Pythagorean Theorem & Distance between Two Points

Vocabulary:

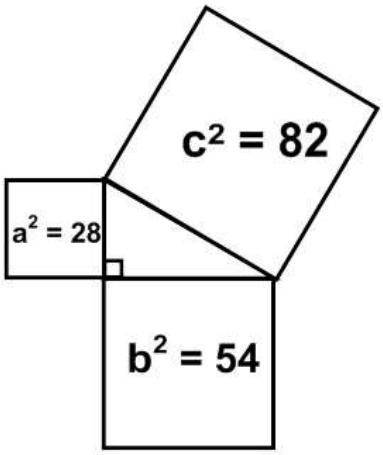
1. *Hypotenuse:* The longest side of a right triangle, directly across from the right angle
2. *Pythagorean Theorem:* Uses $a^2 + b^2 = c^2$ on the side lengths of right triangles.

Review Tips:

I. In a right triangle, the squares of the smaller sides always add to equal the square of the largest side.
II. The hypotenuse is always "c" in the equation $a^2 + b^2 = c^2$
III. When finding the distance between two points on a coordinate plane, draw a line from point to point, and then draw a right triangle based on the line you used to connect the points.

Practice Problems:

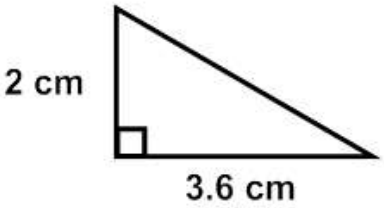
❶ Does the figure to the right form a right triangle? Why or why not?



A. Yes; A right triangle is formed because the length of the smaller sides add up to the largest side.
B. Yes; A right triangle is formed because the squares of the smaller sides add up to the square of the largest side.
C. No; A right triangle was not formed because the length of the smaller sides does not add up to the largest side.
D. No; a right triangle was not formed because squares of the smaller sides do not add to equal the square of the largest side.

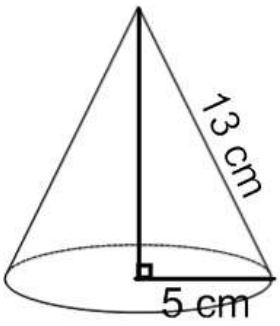
❷ Find the length of the missing side of the right triangle.

A. $\sqrt{12.96}$
B. $\sqrt{5.6}$
C. $\sqrt{16.96}$
D. $\sqrt{7.2}$

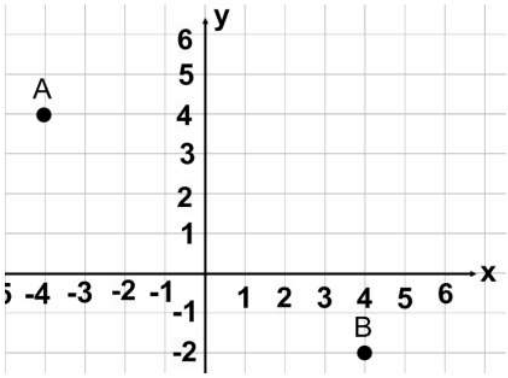


❸ What is the height of the cone if the slant height is 13 cm?

A. 8 cm
B. 18 cm
C. 144 cm
D. 12 cm



❹ Find the distance between point A and point B as shown on the coordinate plane below.



A. 10 units
B. 14 units
C. 100 units
D. 9 units

Volume

MGSE8.G.9 – Applying Volume Formulas to Cylinders, Cones, & Spheres

Vocabulary:

1. *volume*: how much something holds/how much space is *inside* a 3D object

Formulas:

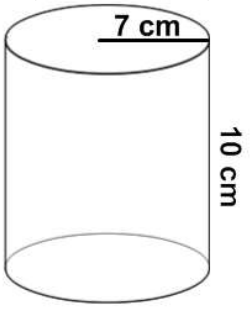
Cylinder: $V = \pi r^2 h$ Cone: $V = \frac{1}{3}\pi r^2 h$ Sphere: $V = \frac{4}{3}\pi r^3$

V = Volume, h = height, r = radius (halfway across a circle)

Practice Problems:

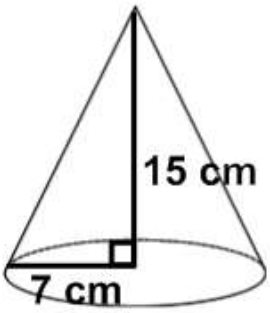
❶ Find the volume of the cylinder. Leave your answer in terms of π.

A. 70π cm^3
B. 17π cm^3
C. 1320π cm^3
D. 490π cm^3



❷ Find the volume of the cone. Use 3.14 for π.

A. 858.3 cm^3
B. 769.3 cm^3
C. 329.7 cm^3
D. 245 cm^3



❸ If the basketball shown below has a radius of 6 inches from the center to the outside surface, *approximately* how many cubic inches of air will it hold when fully inflated?

A. 904.32 in^3
B. 288 in^3
C. 1808.64 in^3
D. 72 in^3

❹ Chris is planning to fill up a kiddie swimming pool for his younger sister but he does not have a water hose. He has decided to use a cylindrical bucket with a diameter of 12 inches and a height of 14.5 inches. He has already calculated the approximate volume of the kiddie pool to be able to hold about 60,000 cubic inches of water. Approximately how many buckets of water will he need to use in order to fill the kiddie pool?

A. Approximately 9 buckets
B. Approximately 115 Buckets
C. Approximately 37 buckets
D. Approximately 29 buckets

❺ A sphere has been placed inside a cylinder with the same dimensions; both have a radius of 6 cm, and a height of 12 cm. How many cubic centimeters of space does the sphere NOT fill up?

A. $432\pi\ cm^3$
B. $72\pi\ cm^3$
C. $288\pi\ cm^3$
D. $144\pi\ cm^3$