Volume of Prisms

$$V = Bh$$

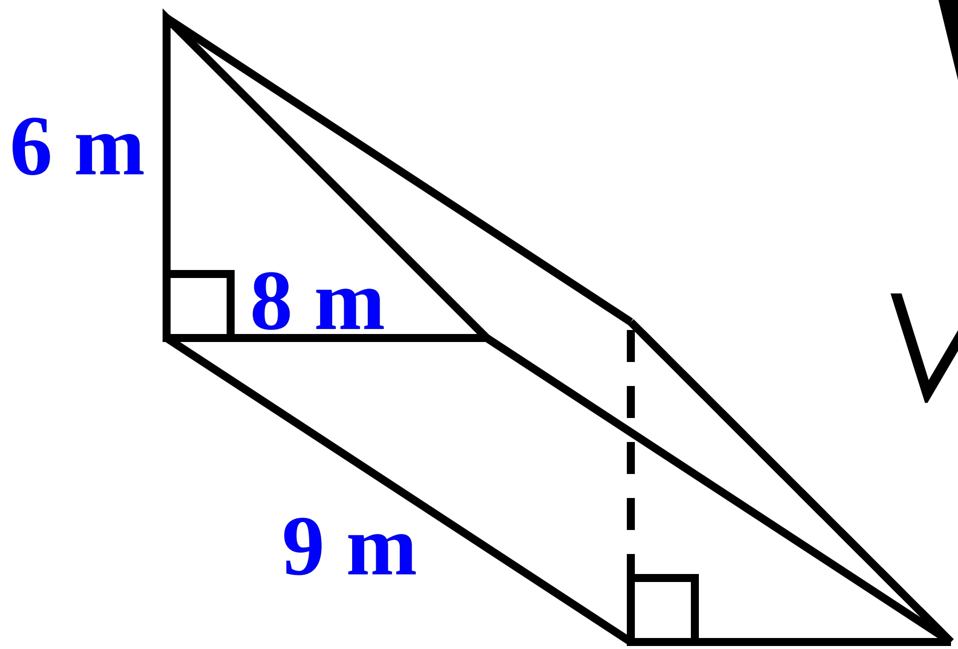
B = area of BASE

(use different formulas according to the shape of the base)

h = HEIGHT of the solid

(distance from base to base)

EX: Find the volume.

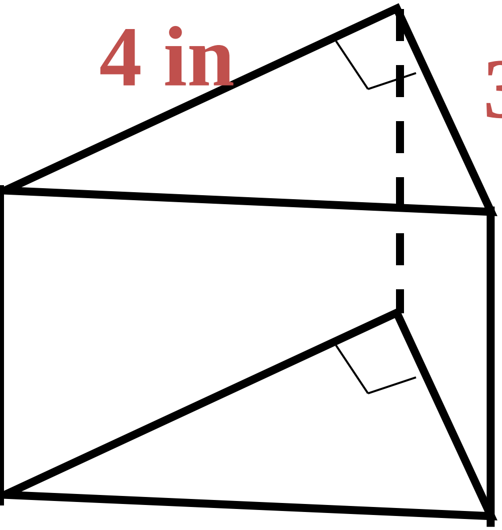


$$V = Bh$$

$$V = \frac{1}{2} \bullet 6 \bullet 8 \bullet 9$$

$$V = 216\ m^3$$

EX: Find the volume.

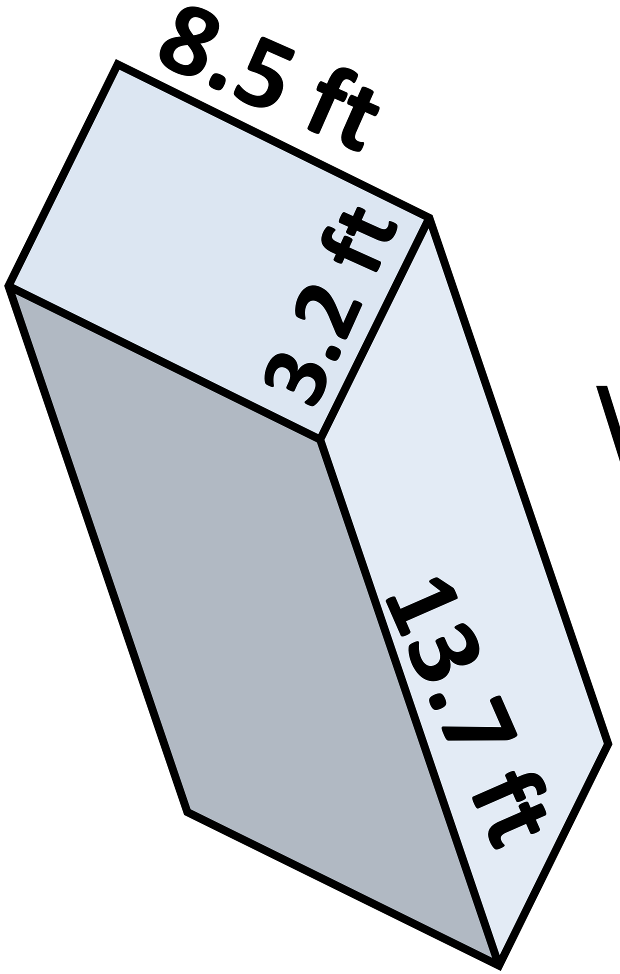


$$V = Bh$$

$$V = \frac{1}{2} \bullet 3 \bullet 4 \bullet 2$$

$$V = 12\ in^3$$

EX: Find the volume.



$V = Bh$

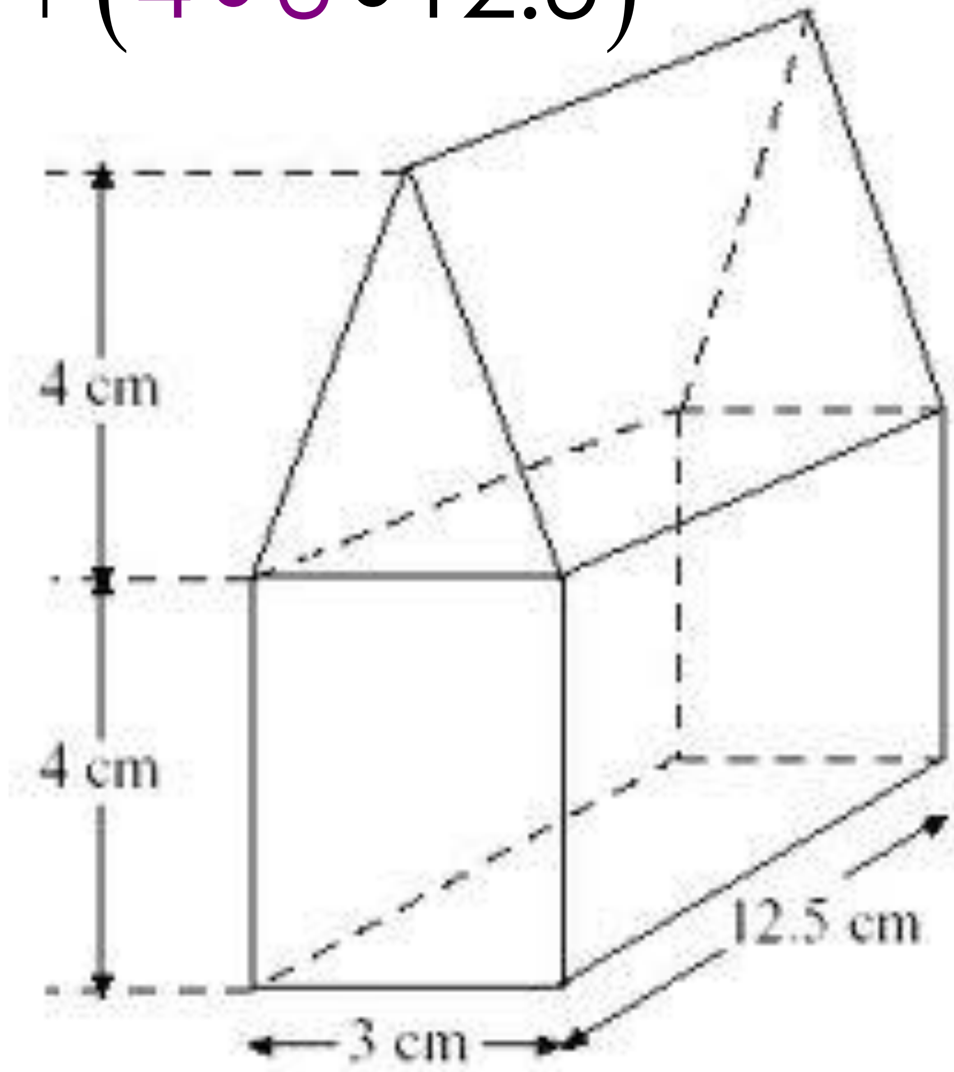
$V = 8.5 \bullet 3.2 \bullet 13.7$

$V = 372.64\ ft^3$

EX: Find the volume.

V = Bh

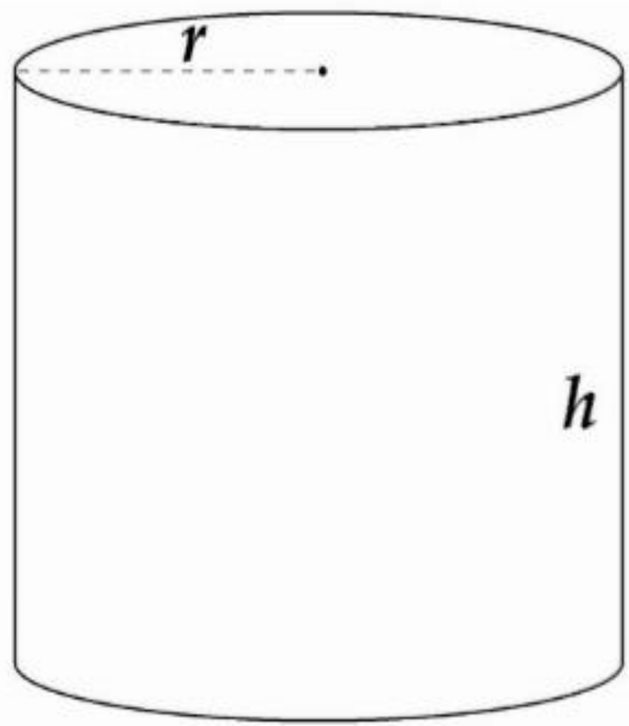
$$V = \left(\frac{1}{2} \bullet 3 \bullet 4 \bullet 12.5\right) + (4 \bullet 3 \bullet 12.5)$$



V = 225 cm^3

Volume of Cylinders

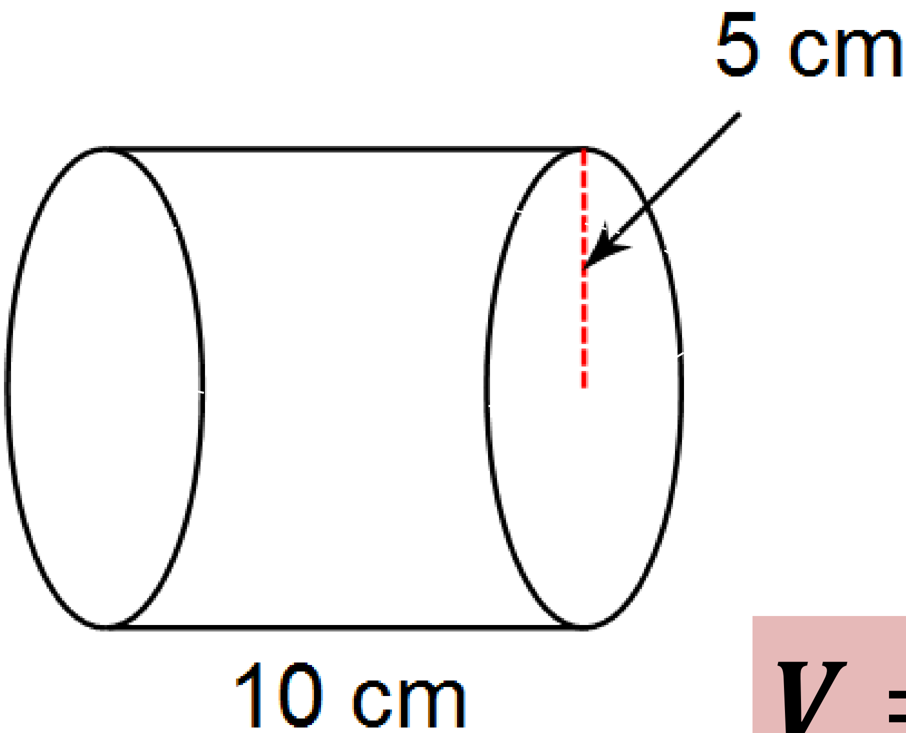
Volume of Cylinders

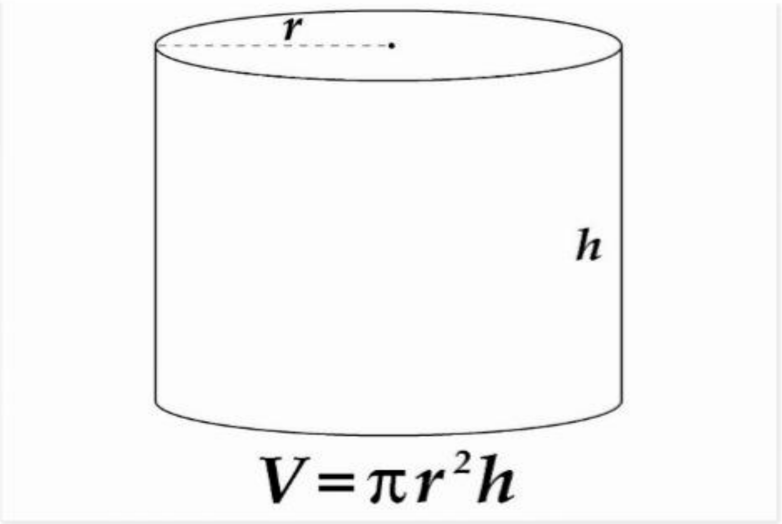


$$V = \pi r^2 h$$

1. Volume of a Cylinder

(leave in terms of pi)



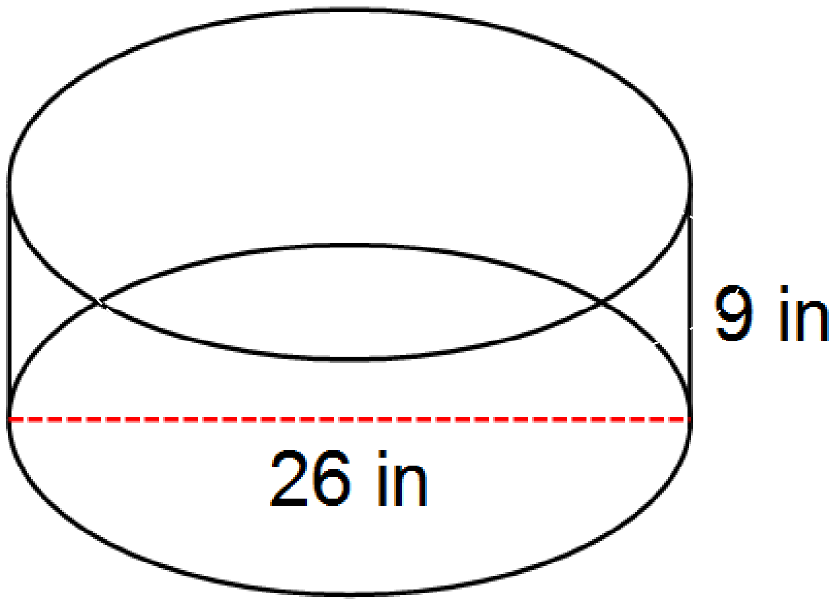


$$V = \pi(5^2)(10)$$

$$V = 250\pi\ cm^3$$

2. Volume of a Cylinder

(round to the nearest tenths)



$$V = \pi r^2 h$$

$$V = \pi(13^2)(9)$$

$$V = \pi(13^2)(9)$$

$$V = 4,775.9 \; in^3$$

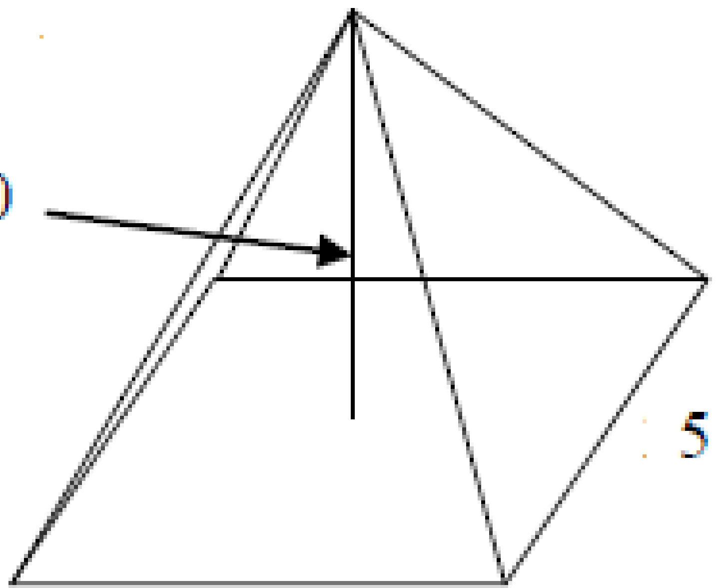
Volume of Pyramids

Volume of Pyramids

$$V = \frac{1}{3}Bh$$

B stands for the area of the base

Find the volume and round to the nearest tenth.



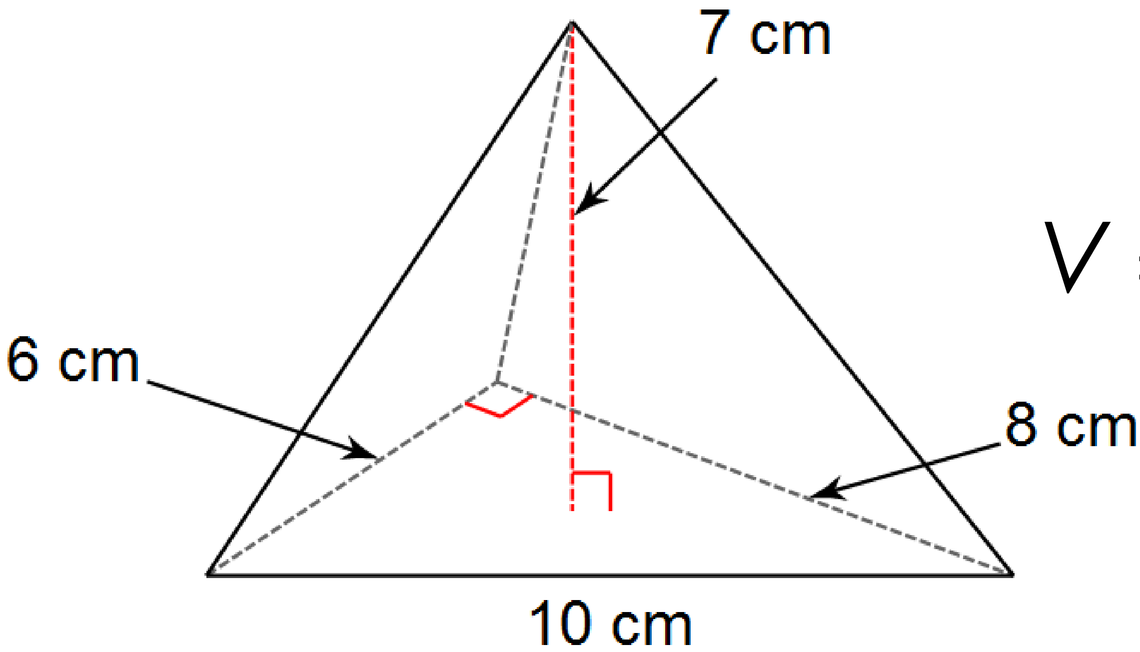
$$V = \frac{1}{3}Bh$$

$$V = \frac{1}{3} \bullet 5 \bullet 5 \bullet 10$$

$$V = 83.3\ units^3$$

Find the volume and round to the nearest tenth.

$$V = \frac{1}{3}Bh$$



$$V = \frac{1}{3} \bullet \frac{1}{2} \bullet 6 \bullet 8 \bullet 7$$

$$V = 56cm^3$$

Volume of Cones

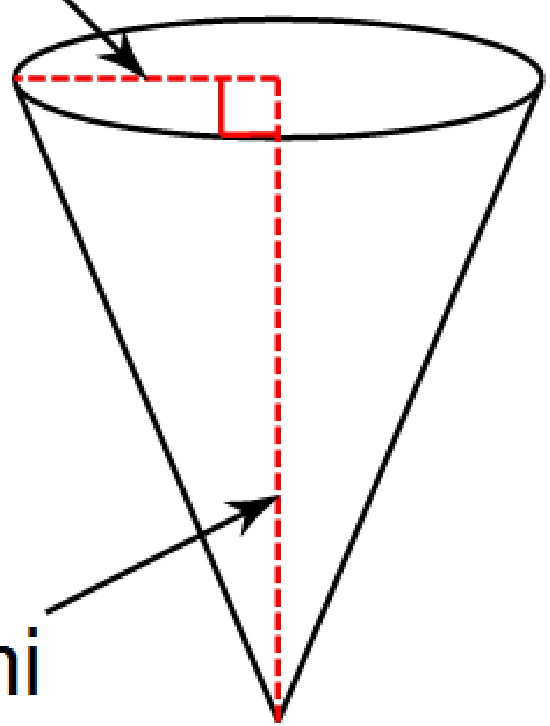
Volume of Cones

$$V = \frac{1}{3}\pi r^2 h$$

B stands for the area of the base and the base of a cone will ALWAYS BE A CIRCLE

h is the distance from vertex perpendicular to the base

3. Find the volume and round to the nearest tenth.

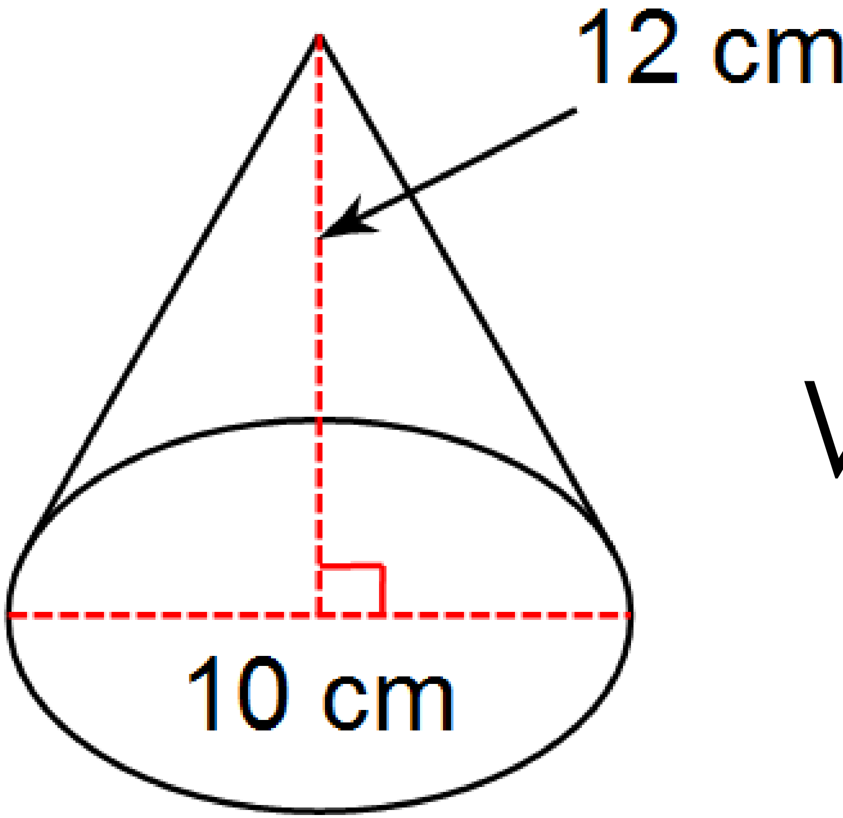


$$V = \frac{1}{3}\pi r^2 h$$

$$V = \frac{1}{3}(\pi)(2)^2(5)$$

$$V = 20.9mi^3$$

4. Find the volume and round to the nearest tenth.

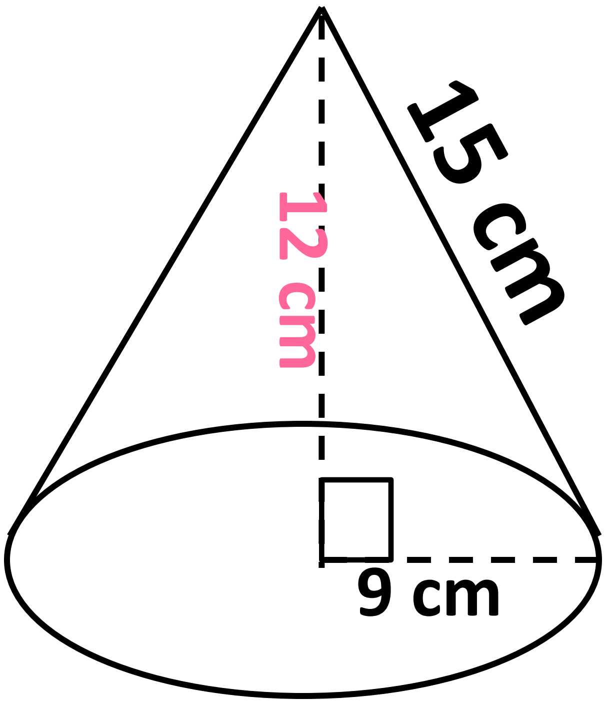


$$V = \frac{1}{3}\pi r^2 h$$

$$V = \frac{1}{3}(\pi)(5)^2(12)$$

$$V = 314.2 cm^3$$

5. Find the volume and round to the nearest tenth.

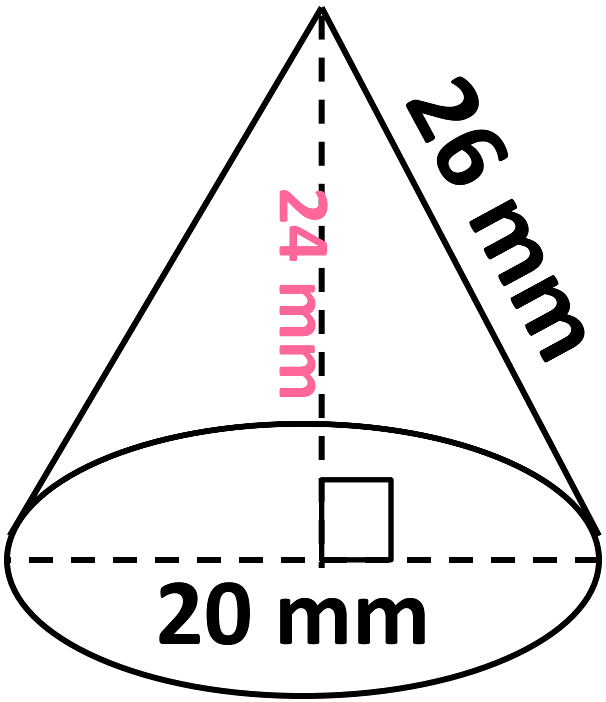


$$V = \frac{1}{3}\pi r^2 h$$

$$V = \frac{1}{3}(\pi)(9)^2(12)$$

$$V = 1017.9\ cm^3$$

6. Find the volume and round to the nearest tenth.

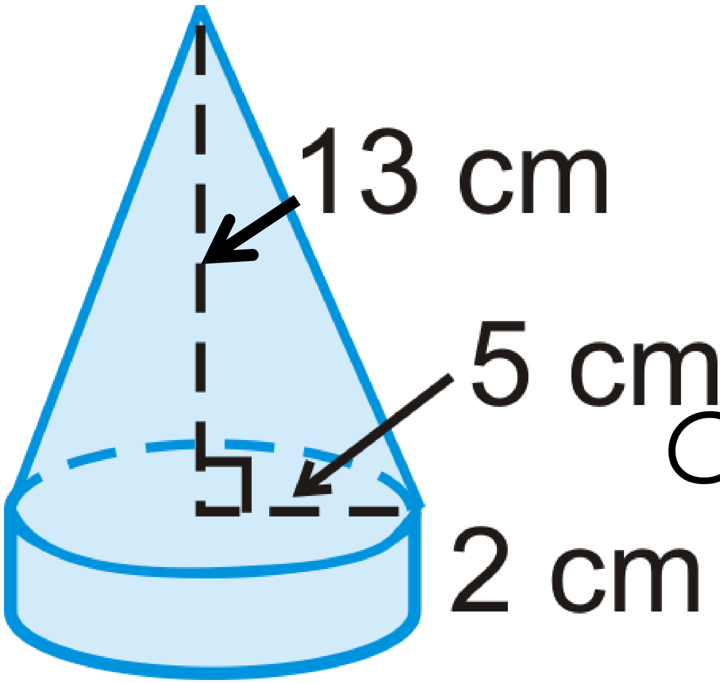


$$V = \frac{1}{3}\pi r^2 h$$

$$V = \frac{1}{3}(\pi)(10)^2(24)$$

$$V = 2513.3\ mm^3$$

7. Find the volume of the composite figure.

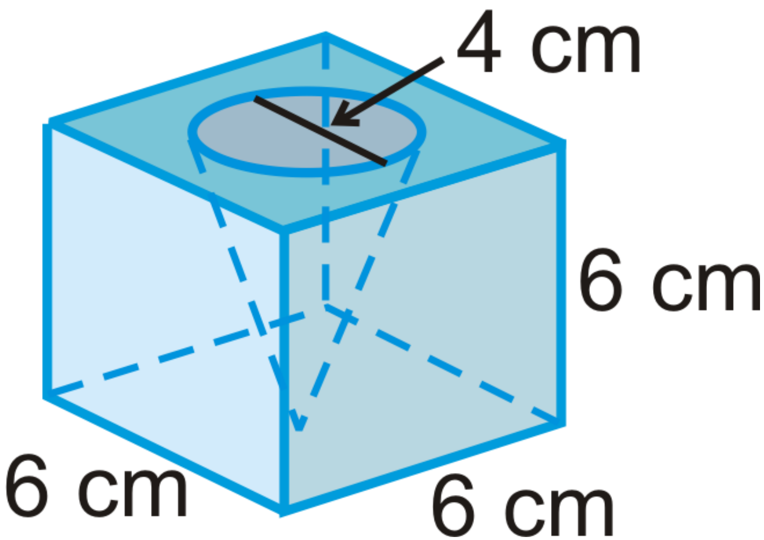


$$Cylinder = 50\pi \ cm.^3 \ or 157.1$$

$$Cone = \frac{325}{3}\pi \ cm.^3 \ or 340.3$$

$$V = 497.4 \ cm^3$$

8. Find the volume of the composite figure.



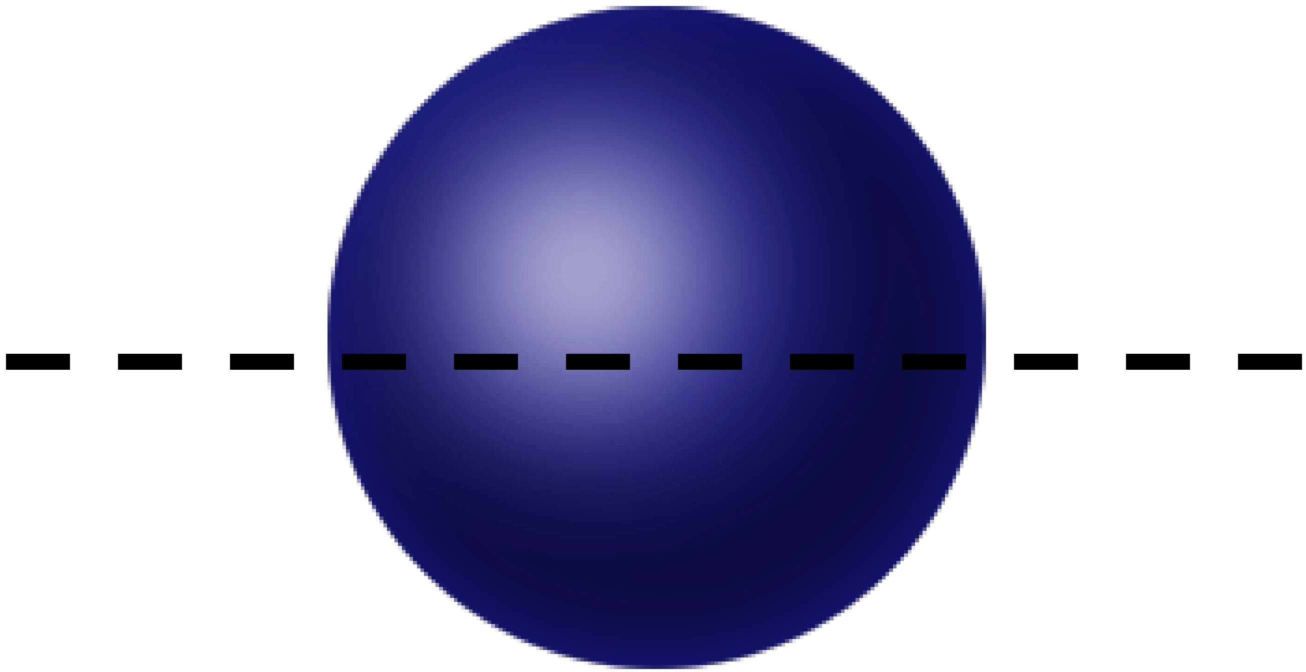
$$Cube = 216\, cm.^3$$

$$Cone = 8\pi\, cm.^3$$

$$V = 190.87\ cm^3$$

Surface Area & Volume of Spheres

If you cut a sphere right down the middle you would create two congruent halves called HEMISPHERES.



You can think of Earth.

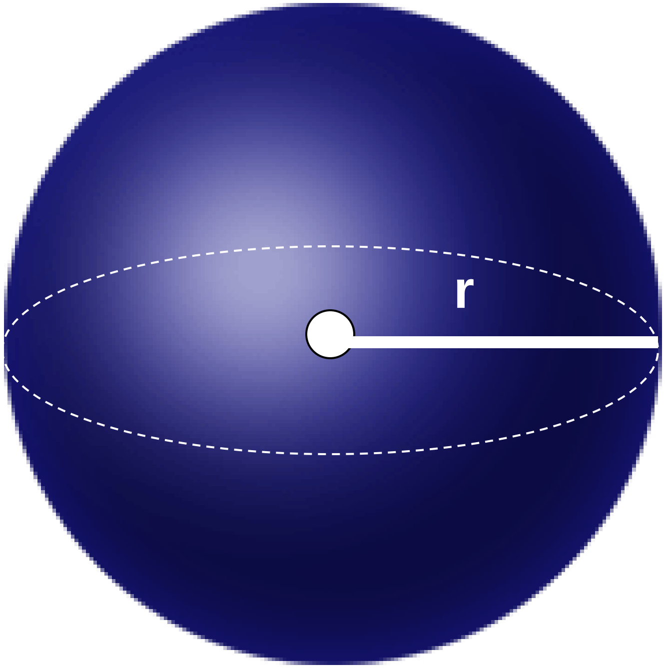
The equator cuts Earth into the northern and southern hemisphere.

Look at the cross section formed when you cut a sphere in half.

What shape is it?

A circle!!! This is called the GREAT CIRCLE of the sphere.

Radius of a Sphere

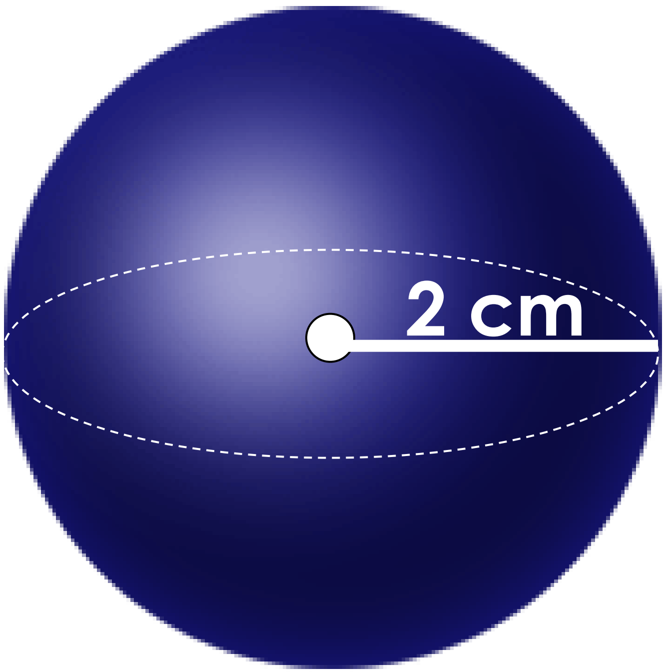


Volume of a Sphere

$$V = \frac{4}{3}\pi r^3$$

Volume of a Sphere

(round to the nearest hundredths)



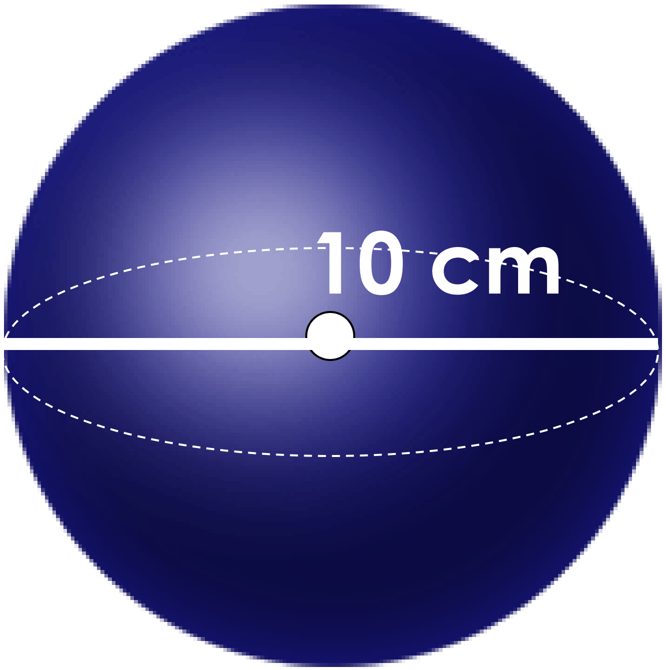
$$V = \frac{4}{3}\pi r^3$$

$$V = \frac{4}{3}\pi (2)^3$$

$$V = 33.51\, cm^3$$

Volume of a Sphere

(round to the nearest hundredths)

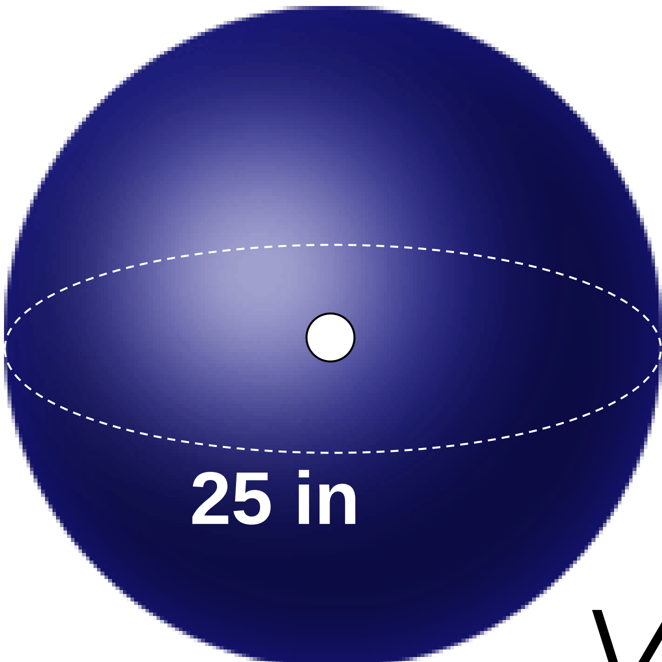


$$V = \frac{4}{3}\pi r^3$$

$$V = \frac{4}{3}\pi(5)^3$$

$$V = 523.60\ cm^3$$

The circumference of a great circle of a sphere is 25 inches. Find the volume of the sphere. **(Round to the nearest hundredths.)**



$$C = 2\pi r$$

$$25 = 2\pi r$$

$$r = 3.979$$

$$V = \frac{4}{3}\pi(3.979)^3$$

$$V = 263.88\ in^3$$

Ratio Relationships

a:b Ratio of the **scale factor**

a:b Ratio of the **corresponding sides**

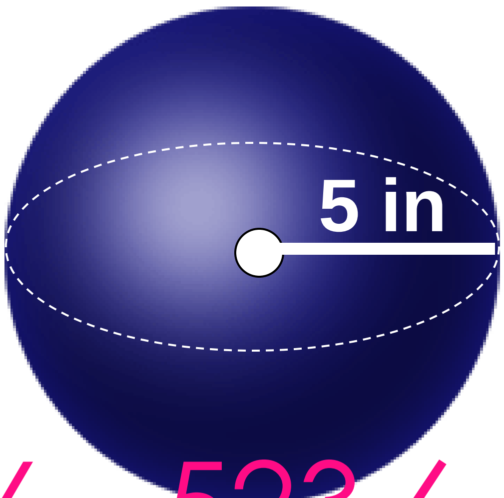
a:b Ratio of the **perimeters**

$\mathbf{a^2:b^2}$ Ratio of the **area**

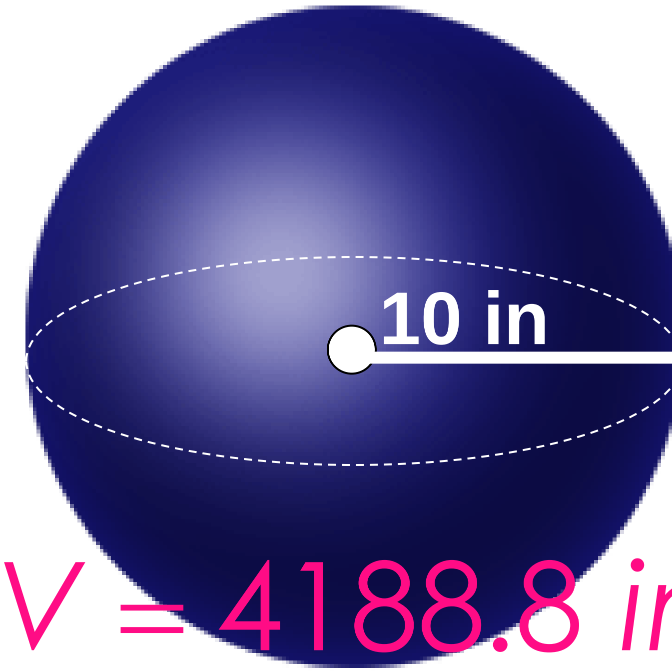
$\mathbf{a^3:b^3}$ Ratio of the **volume**

Volume of a Sphere

A spherical balloon has an initial radius of 5 in. When more air is added, the radius becomes 10 in. Explain how the <u>volume</u> changes as the radius changes.



$$V = \frac{4}{3}\pi r^3$$



$$V = 523.6\ in^3$$

$$V = 4188.8\ in^3$$

5:10 or 1:2. So 1^3:$\mathbf{2^3}$ means the volume would be **8 times** as much.

Volume of a Sphere

A sphere has an initial volume of 400 $cm.^3$ The sphere is made bigger by making the radius 4 times as big. What is the new volume of the sphere?

1:4

So, 1^3:**4^3** means the volume would be **64 times** more volume.

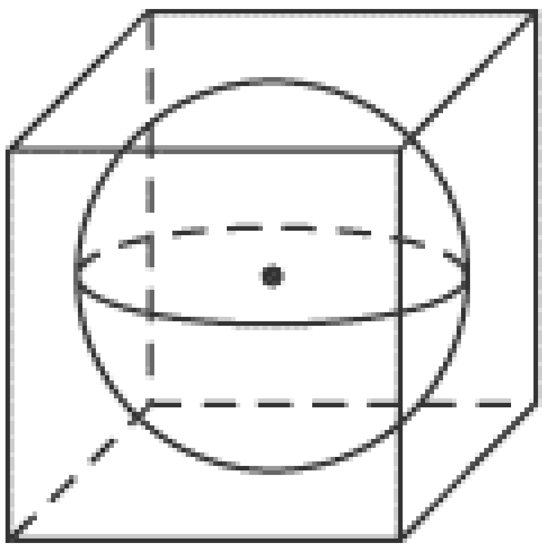
64 times 400 =

$$V = 25{,}600\ cm^3$$

Volume of a Sphere

A sphere is inscribed in a cube-shaped box as pictured below. To the nearest centimeter, what is the volume of the empty space in the box?

$$V_{sphere} = \frac{4}{3}\pi(8)^3$$

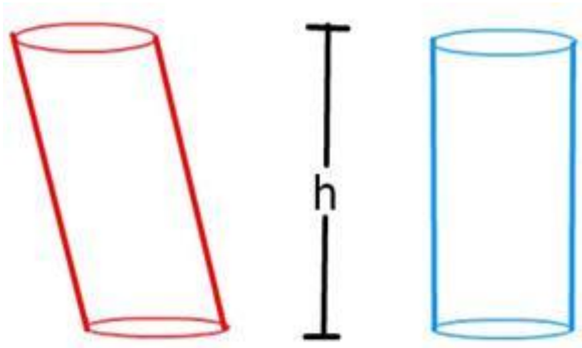


$$V_{cube} = (16)^3$$

$$V_{empty\ space} = 16^3 - \left(\frac{4}{3}\pi(8)^3\right)$$

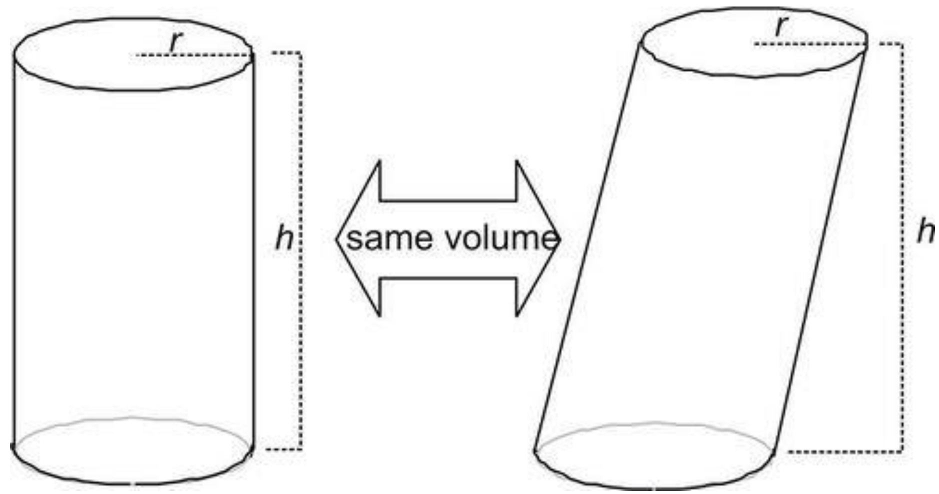
$$V_{empty\ space} = 1951\,\text{cm}^3$$

These have the same base and same height.



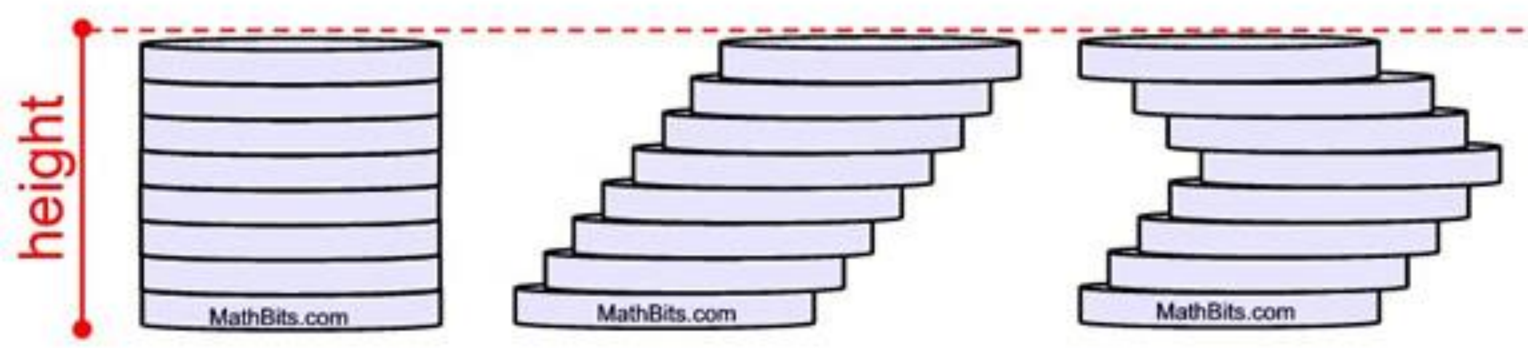
Therefore, they have the same volume.

These have the same base (radius) and same height.



Therefore, they have the same volume.

These have the same base and same height.



Therefore, they have the same volume.