

Geometry

Chapter 11

Section 11-5

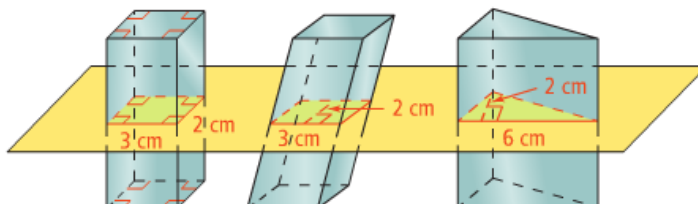
Recall from section 11-4:

take note

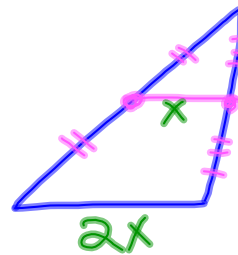
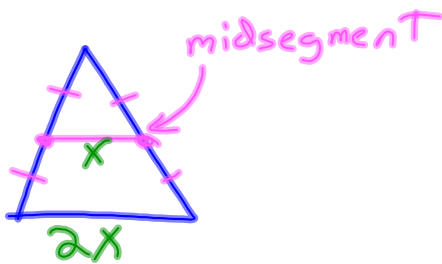
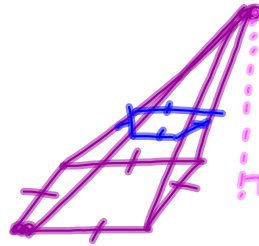
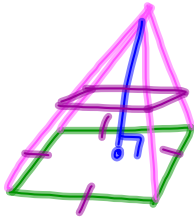
Theorem 11-5 Cavalieri's Principle

If two space figures have the same height and the same cross-sectional area at every level, then they have the same volume.

The area of each shaded cross section below is 6 cm^2 . Since the prisms have the same height, their volumes must be the same by Cavalieri's Principle.



Draw a right pyramid and an oblique pyramid that have the same height and congruent bases. Do they have the same volume?

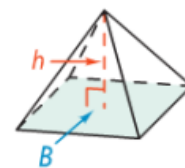


take note

Theorem 11-8 Volume of a Pyramid

The volume of a pyramid is one third the product of the area of the base and the height of the pyramid.

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



****Notes:**

1. The volume of a pyramid is one-third the volume of a prism with the same base and height
2. The volume does not depend on the slant height. This formula works for all pyramids.

take note

Theorem 11-9 Volume of a Cone

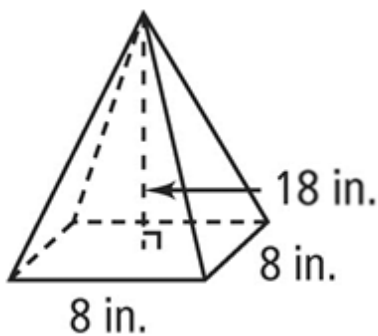
The volume of a cone is one third the product of the area of the base and the height of the cone.

$$V = \frac{1}{3}Bh, \text{ or } V = \frac{1}{3}\pi r^2h$$

****Notes:**

1. The volume of a cone is one-third the volume of a cylinder with the same base and height
2. The volume does not depend on the slant height. This formula works for all cones.

Find the volume of the solid to the nearest hundredth.



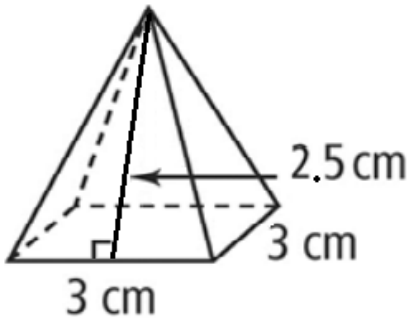
$$B = 64$$

$$h = 18$$

$$V = \frac{1}{3} \cdot 64 \cdot 18$$

$$V = 384 \text{ in}^3$$

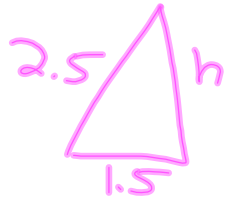
Find the volume of the solid to the nearest hundredth.



$$h = 2 \text{ cm}$$

$$B = 9 \text{ cm}^2$$

$$V = \frac{1}{3} \cdot 9 \cdot 2 = 6 \text{ cm}^3$$



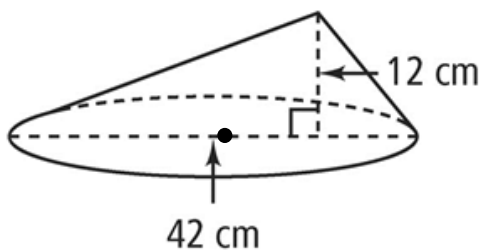
$$2.5^2 = h^2 + 1.5^2$$

$$6.25 = h^2 + 2.25$$

$$4 = h^2$$

$$2 = h$$

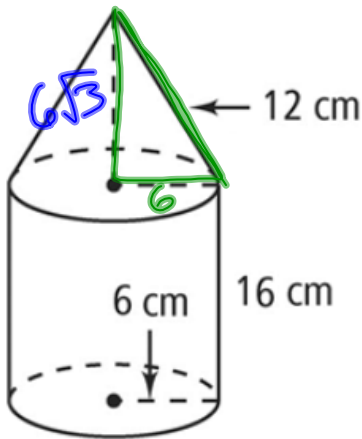
Find the volume of the solid to the nearest hundredth.



$$V = \frac{1}{3} (\pi \cdot 21^2) \cdot 12$$

$$\approx 5541.77 \text{ cm}^3$$

Find the volume of the solid to the nearest hundredth.



$$V_{\text{cone}} = \frac{1}{3} (\pi 6^2) \cdot 6\sqrt{3}$$

$$V_{\text{cyl}} = \pi 6^2 \cdot 16 \\ \approx 2201.34 \text{ cm}^3$$

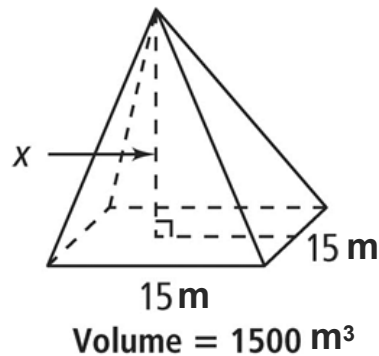
Solve for x.

$$V = \frac{1}{3} B h$$

$$\frac{1500}{15} = \frac{1}{3} (15 \cdot 15) x$$

$$100 = 5x$$

$$20 \text{ m} = x$$



Homework

Pages 730 - 731

10 - 26 even