

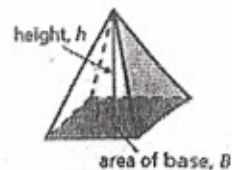
Words The volume, V , of a pyramid is one-third the product of the area of the base and the height of the pyramid.

Algebra

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

Area of base Height of pyramid

The *height* of a pyramid is the perpendicular distance from the base to the vertex.



Example 1: Find the volume of the pyramid.

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

Write formula for volume.

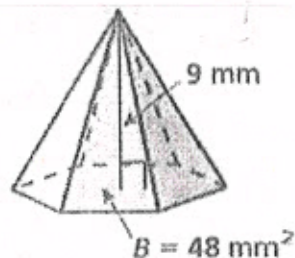
$$V = \frac{1}{3} (48)(9)$$

Substitute 48 for B and 9 for h .

$$V = (16)(9)$$

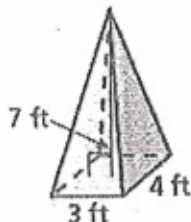
Multiply.

$$V = 144 \text{ mm}^3$$



Example 2: Find the volume of each pyramid.

a.



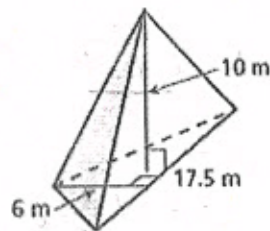
$$V = \frac{1}{3} Bh$$

$$V = \frac{1}{3} (lw)h$$

$$V = \frac{1}{3} (4 \cdot 3)(7)$$

$$V = 28 \text{ feet}^3$$

b.



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

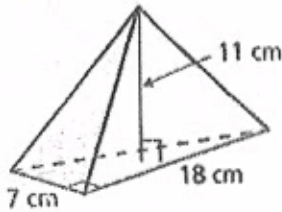
$$V = \frac{1}{3} \left(\frac{1}{2} bh \right) h$$

$$V = \frac{1}{3} \left(\frac{1}{2} \cdot 17.5 \cdot 6 \right) (10)$$

$$V = 175 \text{ meters}^3$$

Try This: Find the volume of the pyramid.

a.



base = triangle

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

$$V = \frac{1}{3} (\frac{1}{2} bh) h$$

$$V = \frac{1}{3} (\frac{1}{2} \cdot 7 \cdot 18) (11)$$

$$V = \frac{1}{3} (693)$$

$$V = 231 \text{ cm}^3$$

Example 3: Below are two different size sunscreen bottles.

a. The volume of sunscreen in Bottle B is about how many times the volume in Bottle A?

Find the volume of each bottle.

Bottle A

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

$$V = \frac{1}{3} (lw)h$$

$$V = \frac{1}{3} (2 \cdot 1)(6)$$

$$V = 4 \text{ in}^3$$

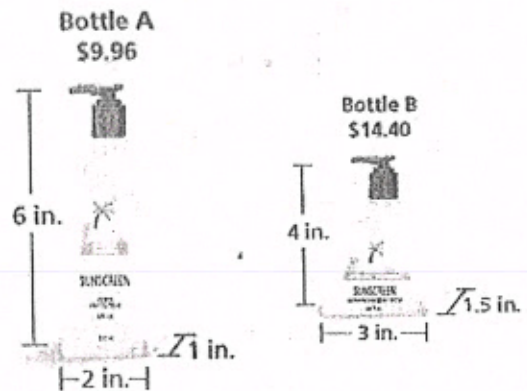
Bottle B

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

$$V = \frac{1}{3} (lw)h$$

$$V = \frac{1}{3} (3 \cdot 1.5)(4)$$

$$V = 6 \text{ in}^3$$



So, the volume of sunscreen in Bottle B is about $\frac{6}{4} = 1.5$ times the volume in Bottle A.

b. Find the unit price for each bottle.

Bottle A

$$\frac{\text{cost}}{\text{volume}} = \frac{\$9.96}{4 \text{ in}^3} = \$2.49 / 1 \text{ in}^3$$

Bottle B

$$\frac{\text{cost}}{\text{volume}} = \frac{\$14.40}{6 \text{ in}^3} = \$2.40 / 1 \text{ in}^3$$

The unit cost of Bottle B is less than the unit cost of Bottle A. So, Bottle B is a better buy.

c. Bottle C is on sale for \$13.20. Is Bottle C a better buy than Bottle B in Example 3? Explain.

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

$$V = \frac{1}{3} (lw)h$$

$$V = \frac{1}{3} (3 \cdot 2)(3)$$

$$V = \frac{1}{3} (18)$$

$$V = 6 \text{ in}^3$$

Unit price

$$\frac{\$13.20}{6 \text{ in}^3} = \frac{\$2.20}{1 \text{ in}^3}$$

Bottle C is a better buy than bottle B because $\$2.20/\text{in}^3 < \$2.40/\text{in}^3$.

