

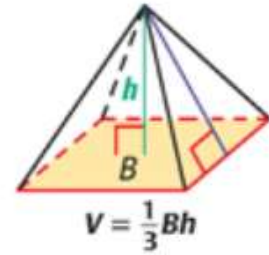
11.7 Volume of Pyramids and Cones

THEOREM 11.9 Volume of a Pyramid

The volume V of a pyramid is

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

where B is the area of the base and h is the height.

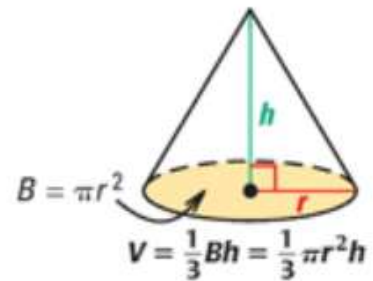


THEOREM 11.10 Volume of a Cone

The volume V of a cone is

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

where B is the area of the base, h is the height, and r is the radius of the base.



xy ALGEBRA Originally, the pyramid had height 144 meters and volume 2,226,450 cubic meters. Find the side length of the square base.

Solution

$$V = \frac{1}{3}Bh \quad \text{Write formula.}$$

$$2,226,450 = \frac{1}{3}(x^2)(144) \quad \text{Substitute.}$$

$$6,679,350 = 144x^2 \quad \text{Multiply each side by 3.}$$

$$46,384 \approx x^2 \quad \text{Divide each side by 144.}$$

$$215 \approx x \quad \text{Find the positive square root.}$$



Khafre's Pyramid, Egypt

Find the volume of the right cone.

Solution

To find the radius r of the base, use trigonometry.

$$\tan 65^\circ = \frac{\text{opp.}}{\text{adj.}} \quad \text{Write ratio.}$$

$$\tan 65^\circ = \frac{16}{r} \quad \text{Substitute.}$$

$$r = \frac{16}{\tan 65^\circ} \approx 7.46 \quad \text{Solve for } r.$$

Use the formula for the volume of a cone.

$$V = \frac{1}{3}(\pi r^2)h \approx \frac{1}{3}\pi(7.46^2)(16) \approx 932.45 \text{ ft}^3$$

