

Cones and Pyramids - Volume



Key idea



A cone or pyramid holds **one third** of the prism on the same base:

$$V = \frac{1}{3} \times \text{base area} \times h.$$

Use the **perpendicular** height h .

Cone



Radius = 3, height = 8.

$$V = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi(3^2)(8) = 24\pi$$

Square pyramid



Base side = 10, height = 9.

Base area = $10^2 = 100$.

$$V = \frac{1}{3}(100)(9) = 300$$

Common mistake

Do not use the **slant** height in a volume formula.

Volume needs the straight-up perpendicular height.

Spheres - Volume



Key idea



A sphere's volume depends only on its radius:

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

Keep π exact unless a decimal is asked for.

Example



Radius = 3.

$$V = \frac{4}{3}\pi(3^3) = \frac{4}{3}\pi(27) = 36\pi$$

Common mistake

Cube the radius first, then multiply.

r^3 means $r \times r \times r$, so $3^3 = 27$ — not $3 \times 3 = 9$.