Volume and Surface Area (Cones and Pyramids)

This worksheet requires you to calculate the volume and surface area of cones and pyramids. Give all non-exact answers correct to 3 significant figures and remember to include units.

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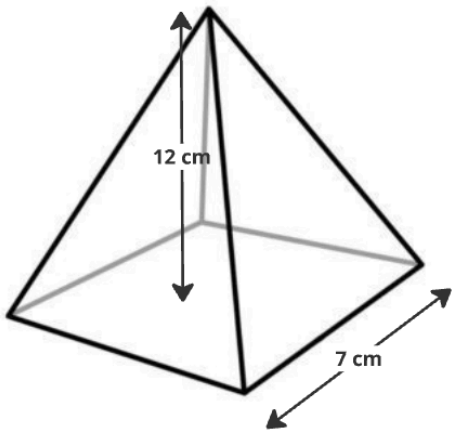
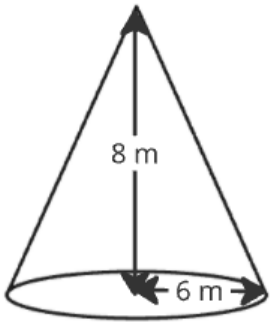
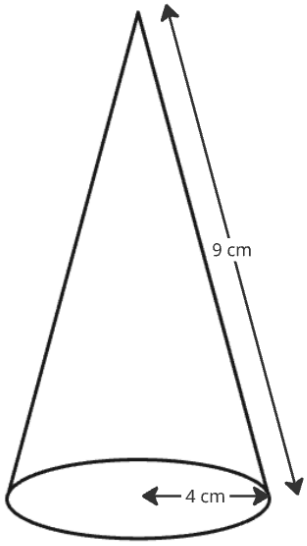
1. Calculate the volume of a square-based pyramid with a base side length of $7\ \text{cm}$ and a perpendicular height of $12\ \text{cm}$.



2. A cone has a radius of $6\ \mathrm{m}$ and a perpendicular height of $8\ \mathrm{m}$. Calculate its volume.



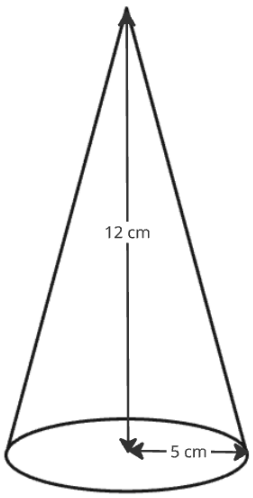
3. Find the total surface area of a cone with a radius of $4\ \mathrm{cm}$ and a slant height of $9\ \mathrm{cm}$.



4. The Great Pyramid of Giza is a square-based pyramid. If its base is $230\ \mathrm{m}$ by $230\ \mathrm{m}$ and its original perpendicular height was $146\ \mathrm{m}$, what was its volume?

Finding Unknown Lengths (Pythagoras Required)

5. A cone has a radius of $5\ \text{cm}$ and a perpendicular height of $12\ \text{cm}$.

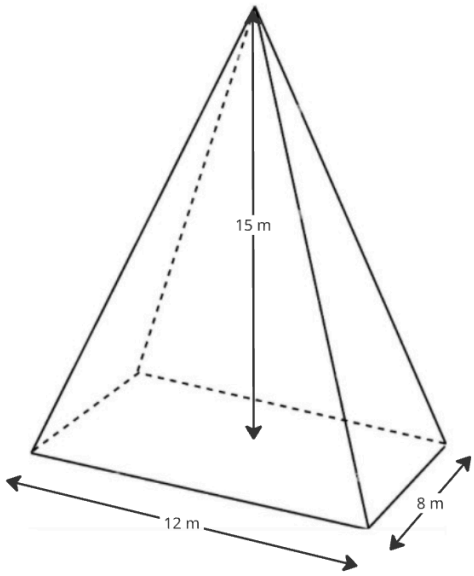


a. Calculate its slant height, l.
b. Calculate the total surface area of the cone.

6. A square-based pyramid has a base side length of $10\ \text{m}$ and a slant height of $13\ \text{m}$.

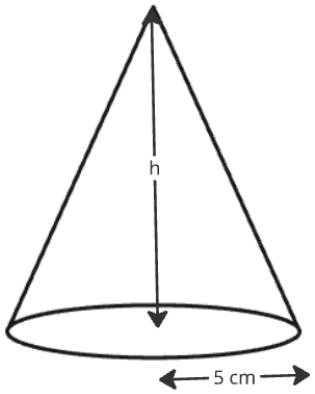
a. Calculate the perpendicular height of the pyramid.
b. Calculate the volume of the pyramid.

7. Calculate the total surface area of the rectangular pyramid shown below.

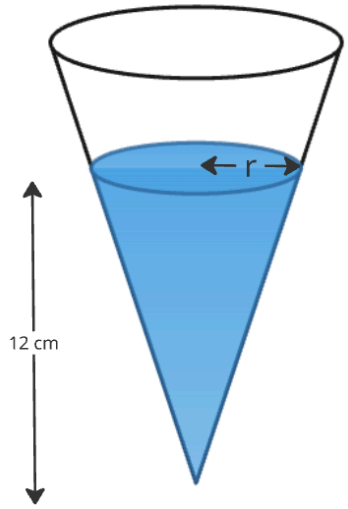


Reverse and Application Problems

8. A cone has a volume of $310\ \text{cm}^3$ and a radius of $5\ \text{cm}$. Find the perpendicular height of the cone.



9. A container is shaped like an inverted cone. It is filled with $500\ \text{ml}$ of water ($500\ \text{cm}^3$). If the height of the cone is $12\ \text{cm}$, what is the radius of the water surface?



10. A canvas tent is shaped like a square-based pyramid. The total area of canvas used for the four triangular faces (excluding the base) is $96\ \text{m}^2$. If the slant height of the tent is $8\ \text{m}$, what is the base side length of the tent?

11. A pile of road salt is in the shape of a cone with a diameter of $10\ \mathrm{m}$ and a perpendicular height of $3.5\ \mathrm{m}$. If one cubic metre of road salt weighs $1.2\ \mathrm{tonnes}$, what is the total weight of the road salt pile in tonnes?

12. The shape below is a "frustum" (a cone with the top cut off) standing on a cylinder. The cylinder has a diameter of $10\ \mathrm{cm}$ and a height of $6\ \mathrm{cm}$. The frustum's bottom radius is $5\ \mathrm{cm}$, top radius is $3\ \mathrm{cm}$, and its height is $4\ \mathrm{cm}$. Calculate the total volume of the composite shape.
(Hint: To calculate the volume of the frustum, find the volume of the large cone and subtract the volume of the small cone that was removed.)