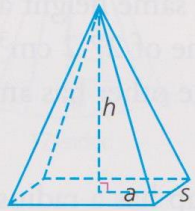
Questions – Volumes of Pyramids and Cones

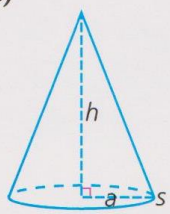
1. Which solids are pyramids?

(a)

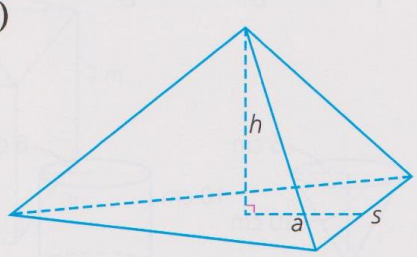
(b)



(c)

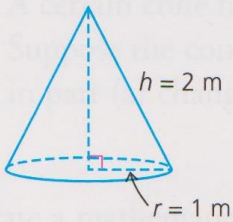


(d)

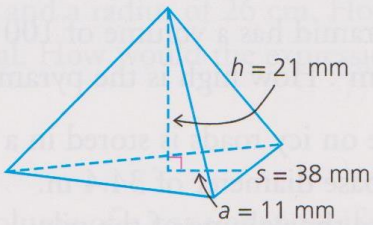


2. Calculate the volume of each solid.

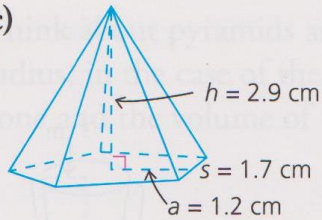
(a)



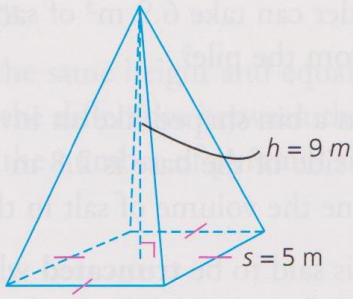
(b)



(c)



(d)



3. Determine the volume of water that would fill

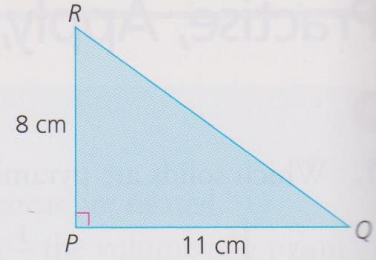
(a) a four-sided pyramid with apothem 4 cm and height 7.5 cm

(b) a cone with radius 4 cm and height 7.5 cm.

4. **(a)** If each shape in Question 3 were filled with crushed ice, would the volumes you found in parts (a) and (b) still apply? Explain.

(b) The volume of a liquid is expressed in litres. Express the volumes you determined in Question 3 in millilitres and litres. (Hint: 1 cm^3 = 1 mL and 1000 mL = 1 L)

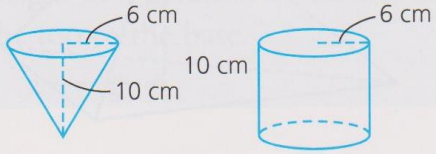
B



5. A cone can be generated by rotating a right triangle 360° about the right angle. Determine the volume of a cone formed by
(a) rotating ΔPQR one full rotation about side PQ
(b) rotating ΔPQR one full rotation about side PR.

6. Two pyramids have the same height and bases of the same shape. One has a volume of 27.2 cm^3 and its base has an apothem of 4 cm. The base of the other has an apothem of 8 cm. What is its volume?

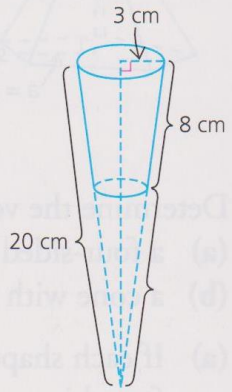
7. A cone-shaped paper cup has a radius of 6 cm and a height of 10 cm. Twice, the cone is filled with water and the water emptied into a cylindrical glass with a radius of 6 cm and a height of 10 cm. What percentage of the glass cylinder is filled with water?



8. A square pyramid has a volume of 100 cm^3 and a base with an area of 40 cm^2. How high is the pyramid?

9. Sand for use on icy roads is stored in a conical pile 14.2 m high and with a base diameter of 34.4 m.
(a) Calculate the volume of the pile.
(b) If one sander can take 6.9 m^3 of sand, how many sanders can be filled from the pile?

10. Salt is stored in a bin shaped like an inverted square-based pyramid. One side of the base is 2.8 m long. The bin is 1.8 m high. Determine the volume of salt in the bin.



11. A solid figure is said to be **truncated** when a portion of the bottom is cut and removed. The cut line must be parallel to the base. Many paper cups, such as the one shown here, are truncated cones. Calculate the volume of this paper cup.

7.4 Volume of Pyramids and Cones

Practise, Apply, Solve

1. (b) and (d)

2. **(a)** $V \doteq 2.09\ \text{m}^3$ **(b)** $V = 4389\ \text{mm}^3$
(c) $V = 4.93\ \text{cm}^3$ **(d)** $V = 75\ \text{m}^3$

3. **(a)** $V = 160\ \text{cm}^3$ **(b)** $V \doteq 125.66\ \text{cm}^3$

4. **(a)** The volumes would be unchanged.
(b) $V = 160$ mL or 0.16 L, $V \doteq 125.66$ or 0.125 L

5. **(a)** $V \doteq 737.23\ \text{cm}^3$ **(b)** $V \doteq 1013.69\ \text{cm}^3$

6. $108.8\ \text{cm}^3$ **7.** 66.7% **8.** 7.5 cm

9. **(a)** $V \doteq 4399.2\ \text{m}^3$ **(b)** 637 sanders

10. $4.704\ \text{m}^3$

11. about $147.87\ \text{cm}^3$

12. The 4-sided pyramid holds most. A cone with the same dimensions will have a smaller volume than any of these figures.

13. $20.4\ \text{m}^3$

14. **(a)** $h = \frac{3V}{\pi r^2}$ **(b)** $h \doteq 148.3$ cm **(c)** $h = \sqrt[3]{\frac{3V}{\pi}}$