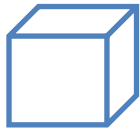


All the solids below have volume 64cm^3 . Find the *exact* values of a, b, c, d, e, f and g



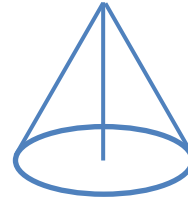
A cube, side a cm



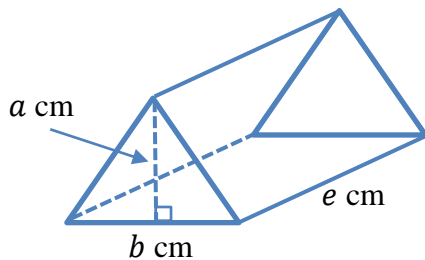
A cuboid, sides a, b and 8 cm



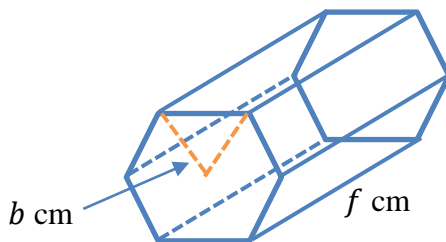
A right-cylinder, radius 2 cm and height c cm



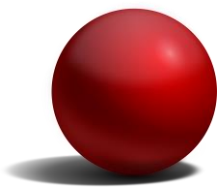
A right-cone, radius b cm and height d cm



A triangular prism



The cross-sectional area of this prism is a regular hexagon



The radius of this sphere is g cm

- Find the exact sloping length, l cm, of the cone
- Find the exact length, s cm, of the other two sides of the triangular base of the tetrahedron
- Write down, with reasons the length, t cm of the hexagon, the cross-sectional area, of the hexagonal-based prism
- Calculate the exact total surface area of each solid

Solutions

$$a = 4$$

$$b = 2$$

$$c = \frac{16}{\pi}$$

$$d = \frac{48}{\pi}$$

$$e = 16$$

$$f = \frac{32\sqrt{3}}{9}$$

$$g = 2 \left(\frac{6}{\pi} \right)^{\frac{1}{3}}$$

$$l = \frac{2}{\pi} \sqrt{\pi^2 + 576}$$

$$s = \sqrt{17}$$

$t = 2$, the cross-sectional area is made from 6 equilateral triangles

Surface areas:

Drawing nets/plans and elevations may help

$$\text{Cuboid } 6 \times 4^2 = 96\text{cm}^2$$

$$\text{Cuboid } 2(8 \times 2 + 4 \times 2 + 4 \times 8) = 112\text{cm}^2$$

$$\text{Cylinder } \pi \times 2^2 \times 2 + 2\pi \times 2 \times \frac{16}{\pi} = (8\pi + 64)\text{cm}^2$$

$$\text{Cone } \pi \times 2^2 + \pi \times 2 \times \frac{16}{\pi} = (4\pi + 4\sqrt{\pi^2 + 576})\text{cm}^2$$

$$\text{Triangular prism } \frac{2 \times 4}{2} \times 2 + 16 \times 2 + 16\sqrt{17} \times 2 = (40 + 32\sqrt{17})\text{cm}^2$$

$$\text{Hexagonal-based prism } 6\sqrt{3} \times 2 + 2 \times \frac{32\sqrt{3}}{9} \times 6 = \frac{164}{3}\sqrt{3}\text{cm}^2$$

$$\text{Sphere } 4\pi \times \left(2 \left(\frac{6}{\pi} \right)^{\frac{1}{3}} \right)^2 = 16\pi \left(\frac{6}{\pi} \right)^{\frac{2}{3}} \text{cm}^2$$