Dr Oliver Mathematics
Worked Examples
Mensuration 2

From: IGCSE 2012 January Paper 4H Q20: Calculator

1. A solid cone has a slant height of 9 cm. (5)

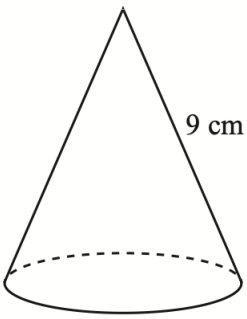

Diagram **NOT** accurately drawn

The **curved** surface area of the cone is 100 cm^2.

Calculate the volume of the cone.
Give your answer correct to 3 significant figures.

Solution

Let h cm be the cone's height and the r cm be the cone's radius.

Then,

$$A = \pi r l \Rightarrow 100 = \pi \times r \times 9$$
$$\Rightarrow r = \frac{100}{9\pi}.$$

Pythagoras' theorem:

$$h^2 + r^2 = 9^2 \Rightarrow h^2 = 81 - \frac{10\,000}{81\pi^2}.$$
$$\Rightarrow h = \sqrt{81 - \frac{10\,000}{81\pi^2}}.$$

Finally,

$$\begin{aligned} V &= \tfrac{1}{3}\pi r^2 h \\ &= \tfrac{1}{3} \times \pi \times \frac{10\,000}{81\pi^2} \times \sqrt{81 - \frac{10\,000}{81\pi^2}} \\ &= 108.407\,986\,7 \text{ (FCD)} \\ &= \underline{\underline{108 \text{ cm}^3 \text{ (3 sf)}}}. \end{aligned}$$