

## Area and Volume (III)

### Solution

$$\begin{aligned}
 2. \quad (a) \quad AC^2 &= 30^2 + 14^2 \text{ (Pyth. Thm.)} \\
 &= 1096 \\
 AC &= 2\sqrt{274}
 \end{aligned}$$

$$\begin{aligned}
 V'C &= \sqrt{274} \\
 \text{height} &= \sqrt{351} \\
 \text{Volume} &= \frac{1}{3} \times 30 \times 14 \times \sqrt{351} \\
 &= 2623 \text{ cm}^3
 \end{aligned}$$

(b) Consider  $\triangle VAB$ , let the mid-point of  $AB$  be  $M$ .

$$\begin{aligned}
 VM^2 &= 25^2 - \left(\frac{30}{2}\right)^2 \\
 &= 400 \\
 VM &= 20 \text{ cm}
 \end{aligned}$$

Consider  $\triangle VBC$ , let the mid-point of  $BC$  be  $N$ .

$$\begin{aligned}
 VN^2 &= 25^2 - \left(\frac{14}{2}\right)^2 \\
 &= 576 \\
 VN &= 24 \text{ cm}
 \end{aligned}$$

Total surface area

$$\begin{aligned}
 &= 30 \times 14 + 2 \times \frac{30 \times 20}{2} + 2 \times \frac{14 \times 24}{2} \\
 &= 420 + 600 + 336 \\
 &= 1356 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 3. \quad (a) \quad \text{volume} &= \frac{1}{3}\pi r^2 h \\
 &= \frac{1}{3}\pi (20)^2 (21) \\
 &= 2800\pi \text{ cm}^3
 \end{aligned}$$

(b) Let the slant edge be  $x$ .

$$\begin{aligned}
 x^2 &= 20^2 + 21^2 \\
 &= 841 \\
 x &= 29 \text{ cm}
 \end{aligned}$$

$$\begin{aligned}
 \text{curved surface area} &= \pi (20)(29) \\
 &= 580\pi \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 4. \quad (a) \quad \text{volume of cylinder} &= \pi r^2 h \\
 &= \pi (4)^2 (10) \\
 &= 160\pi \text{ cm}^3
 \end{aligned}$$

(b) volume of circular cone = volume of cylinder

$$\begin{aligned}
 \frac{1}{3}\pi r^2 h &= 160\pi \\
 (6)^2 h &= 480 \\
 h &= \frac{40}{3} \text{ cm}
 \end{aligned}$$