Area and Volume (III)

Solution

2. (a) $AC^2 = 30^2 + 14^2$ (Pyth. Thm.)
$= 1096$
$AC = 2\sqrt{274}$

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

(b) Consider ΔVAB, let the mid-point of AB be M.
$VM^2 = 25^2 - \left(\frac{30}{2}\right)^2$
$= 400$
$VM = 20$ cm

Consider ΔVBC, let the mid-point of BC be N.
$VN^2 = 25^2 - \left(\frac{14}{2}\right)^2$
$= 576$
$VN = 24$ cm

Total surface area
$= 30 \times 14 + 2 \times \frac{30 \times 20}{2} + 2 \times \frac{14 \times 24}{2}$
$= 420 + 600 + 336$
$= 1356 \text{ cm}^2$

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

(b) Let the slant edge be x.
$x^2 = 20^2 + 21^2$
$= 841$
$x = 29$ cm

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

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

(b) volume of circular cone = volume of cylinder
$\frac{1}{3}\pi r^2 h = 160\pi$
$(6)^2 h = 480$
$h = \frac{40}{3}$ cm