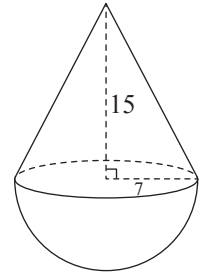


Volume and Surface Area

1. The figure shows a cone mounted on a hemisphere such that the height and radius of the cone is 15 cm and 7 cm respectively.

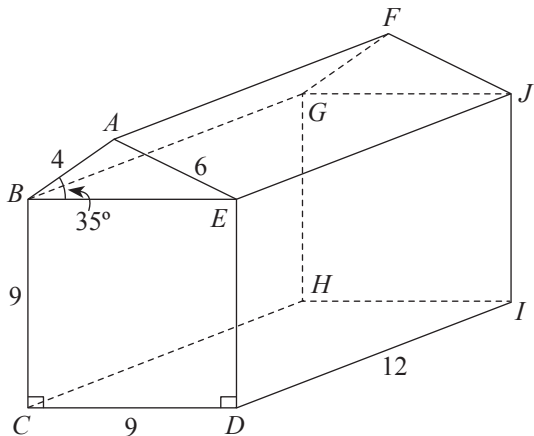
Calculate

- (a) the volume of the solid,
 (b) the total surface area of the solid.



2. The diagram shows a prism in which $BEDC$ is a square of side 9 cm, $AB = 4$ cm, $AE = 6$ cm, $DI = 12$ cm and $\angle ABE = 35^\circ$. Find

- (a) the area of $\triangle ABE$,
 (b) the volume of the prism,
 (c) the total surface area of the prism.



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Volume and Surface Area

1. (a) Volume of cone $= \frac{1}{3}\pi(7^2) \times 15$
 $= 245\pi \text{ cm}^3$

Volume of hemisphere $= \frac{2}{3}\pi(7^3)$
 $= 228\frac{2}{3}\pi \text{ cm}^3$

Volume of solid $= 245\pi + 228\frac{2}{3}\pi$
 $= 473\frac{2}{3}\pi \text{ cm}^3$
 $= 1490 \text{ cm}^3 \quad (3 \text{ s.f.})$

(b) Let the slant height be l cm.

By Pythagoras' Theorem, $15^2 + 7^2 = l^2$

$$l^2 = 274$$

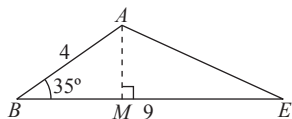
$$l = \sqrt{274} \text{ cm}$$

Total surface area = curved surface area of cone + curved surface area of hemisphere
 $= \pi(7)(\sqrt{274}) + 2\pi(7^2)$
 ≈ 671.8944
 $= 672 \text{ cm}^2 \quad (3 \text{ s.f.})$

2. (a) $\sin 35^\circ = \frac{AM}{4}$

$$AM = 4 \sin 35^\circ$$

$$\approx 2.2943057$$



Area of $\triangle ABE = \frac{1}{2} \times 9 \times 2.2943057$
 $\approx 10.32437 \text{ cm}^2$
 $= 10.3 \text{ cm}^2 \quad (3 \text{ s.f.})$

(b) Base area of prism $ABCDE = (9 \times 9) + 10.32437$
 $= 91.32437 \text{ cm}^2$

Volume of prism $= 91.32437 \times 12$
 $= 1095.89244$
 $= 1100 \text{ cm}^3 \quad (3 \text{ s.f.})$

(c) Total surface area = (Perimeter of base \times height) + 2(base area)
 $= (4 + 6 + 9 + 9 + 9) \times 12 + 2(91.32437)$
 $= 626.64874$
 $= 626 \text{ cm}^2 \quad (3 \text{ s.f.})$

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