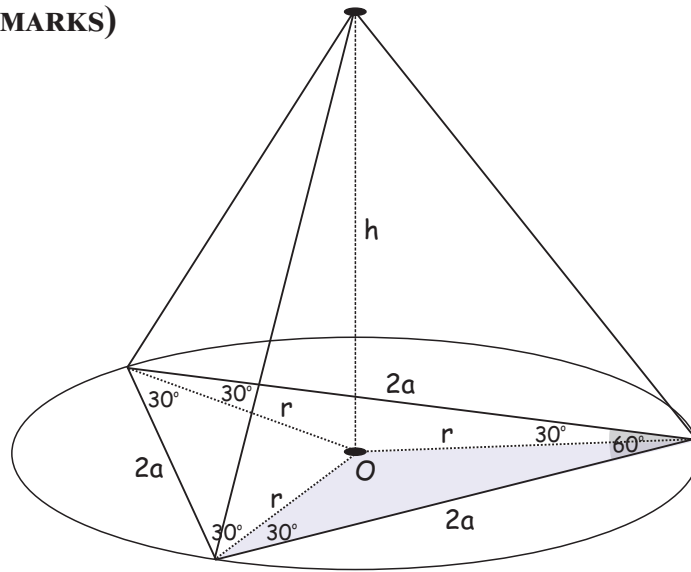
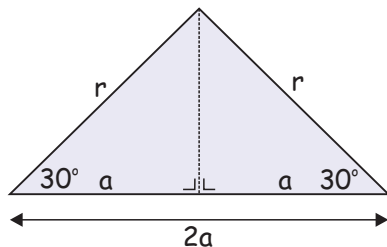
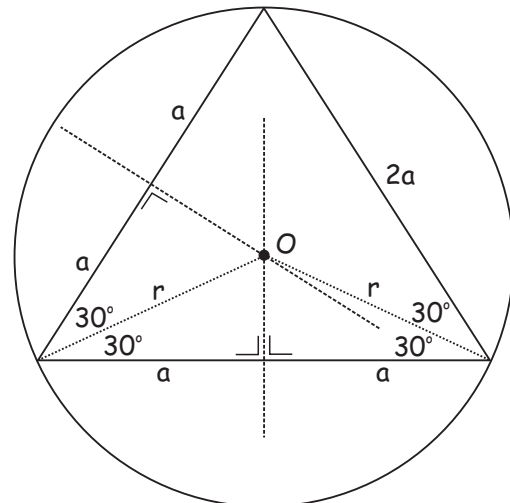


SAMPLE PAPER 2014 (SET F): PAPER 2

QUESTION 9 (25 MARKS)



An equilateral triangle fits into the base of the cylinder exactly. The circle at the base of the cylinder is a circumcircle with centre O . The centre of a circumcircle O is found by intersecting the perpendicular bisectors of the sides of the triangle. Lift out the highlighted triangle to find an expression for r .



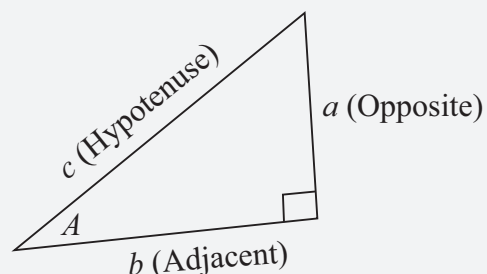
$$\cos 30^\circ = \frac{a}{r}$$

$$\frac{\sqrt{3}}{2} = \frac{a}{r}$$

$$\therefore r = \frac{2a}{\sqrt{3}}$$

FORMULAE AND TABLES BOOK

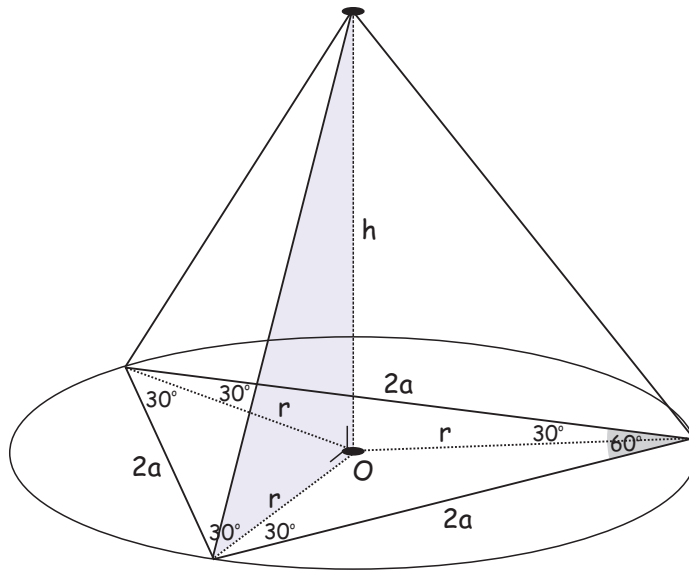
Trigonometry: Right-angled triangle [page 16]



$$\sin A = \frac{a}{c}, \quad \cos A = \frac{b}{c}, \quad \tan A = \frac{a}{b}$$

$$c^2 = a^2 + b^2$$

Lift out the highlighted triangle to find an expression for h . It is a right-angled triangle.

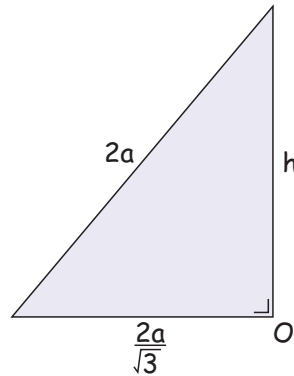


$$h^2 + \left(\frac{2a}{\sqrt{3}}\right)^2 = (2a)^2$$

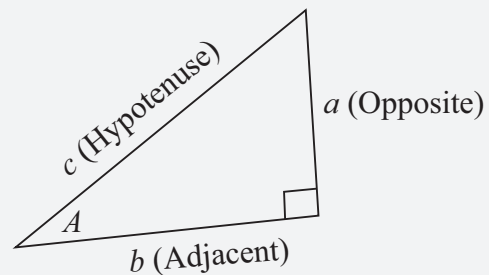
$$h^2 + \frac{4a^2}{3} = 4a^2$$

$$h^2 = 4a^2 - \frac{4a^2}{3} = \frac{8a^2}{3}$$

$$h = \sqrt{\frac{8a^2}{3}} = \frac{2\sqrt{2}a}{\sqrt{3}}$$



FORMULAE AND TABLES BOOK
Trigonometry: Right-angled triangle [page 16]



$$\sin A = \frac{a}{c}, \cos A = \frac{b}{c}, \tan A = \frac{a}{b}$$

$$c^2 = a^2 + b^2$$

$$V = \pi r^2 h$$

$$= \pi \left(\frac{2a}{\sqrt{3}}\right)^2 \left(\frac{2\sqrt{2}a}{\sqrt{3}}\right)$$

$$= \pi \left(\frac{4a^2}{3}\right) \left(\frac{2\sqrt{2}a}{\sqrt{3}}\right)$$

$$= \frac{8\pi\sqrt{2}a^3}{3\sqrt{3}}$$

$$= \frac{8\pi\sqrt{2}a^3}{3\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$$

$$= \left(\frac{8\sqrt{6}}{9}\right) \pi a^3$$

FORMULAE AND TABLES BOOK
Surface area and volume:
Cylinder [page 10]

