Use the π key unless a question says otherwise. Give answers to one decimal place where they are not exact. **In question 1 try numbers first if the letters are difficult, then do it with the letters.**

1 Cylinder A has radius $2x$ and height h. Cylinder B has radius x and height $2h$. Both are open at both ends.

(a) Write an expression for the volume of A (2)

(b) Write an expression for the volume of B (2)

(c) **Which has the greater volume, and how many times greater?** (1)

(d) Write an expression for the curved surface area of each (3)

(e) **Compare the two curved surface areas and explain what you find.** (2)

(10 marks)

2 A cube has side s.

(a) Write an expression for its surface area (1)

(b) A second cube has side $2s$. **Write an expression for its surface area.** (2)

(c) **How many times greater is the surface area?** (1)

(d) **The volumes are s^3 and $8s^3$. Explain why the volume grows faster than the surface area.** (2)

(6 marks)

3 A closed cylinder has radius x and height x. Its total surface area is 100 cm^2.

(a) Show that the total surface area is $4\pi x^2$ (3)

(b) Find x (3)

(6 marks)

4 A cuboid is 7 cm by 5 cm by 4 cm.

(a) Find its volume (1)

(b) Find its surface area (2)

(3 marks)

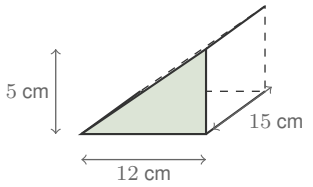
5 A closed cylinder has radius 3.5 cm and height 10 cm.

(a) Find its volume (2)

(b) Find its total surface area (3)

(5 marks)

6 A triangular prism has a right-angled cross-section with shorter sides 5 cm and 12 cm. It is 15 cm long.



(a) Find its volume (2)

(b) Find its total surface area (4)

(c) **Write down the units of each answer and explain why they are different.** (2)

(8 marks)