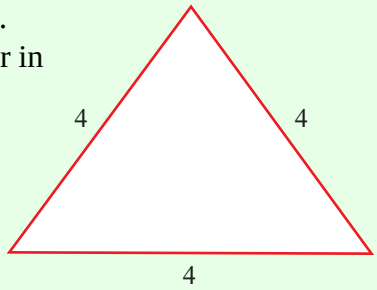
Area & Volume (Q 1, Paper 2)

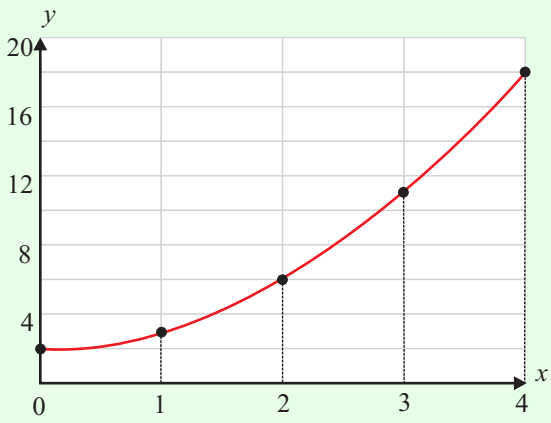
2002

1 (a) Each side of an equilateral triangle measures 4 units. Calculate the area of the triangle, giving your answer in surd form.

Note: Area of a triangle $= \frac{1}{2}ab\sin C$.



(b) The diagram shows the curve $y = x^2 + 1$ in the domain $0 \le x \le 4$.



(i) Copy the following table. Then, complete it using the equation of the curve:

x	0	1	2	3	4
y					

(ii) Hence, use Simpson's Rule to estimate the area between the curve and the x-axis.

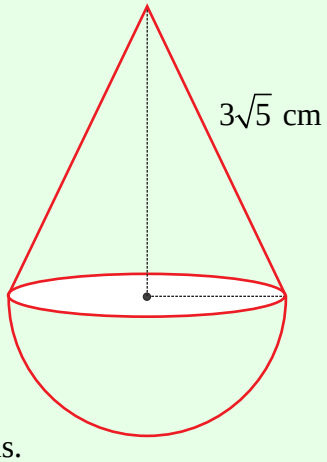
(c) A solid is in the shape of a hemisphere surmounted by a cone, as in the diagram.

(i) The volume of the hemisphere is 18π cm^3.
Find the radius of the hemisphere.

(ii) The slant height of the cone is $3\sqrt{5}$ cm.
Show that the vertical height of the cone is 6 cm.

(iii) Show that the volume of the cone equals the volume of the hemisphere.

(iv) This solid is melted down and recast in the shape of a solid cylinder.
The height of the cylinder is 9 cm. Calculate its radius.



ANSWERS

1 (a) $4\sqrt{3}$ units^2

(b) (i)

x	0	1	2	3	4
y	1	2	5	10	17

(ii) $\frac{76}{3}$ units^2

(c) (i) 3 cm (iv) 2 cm