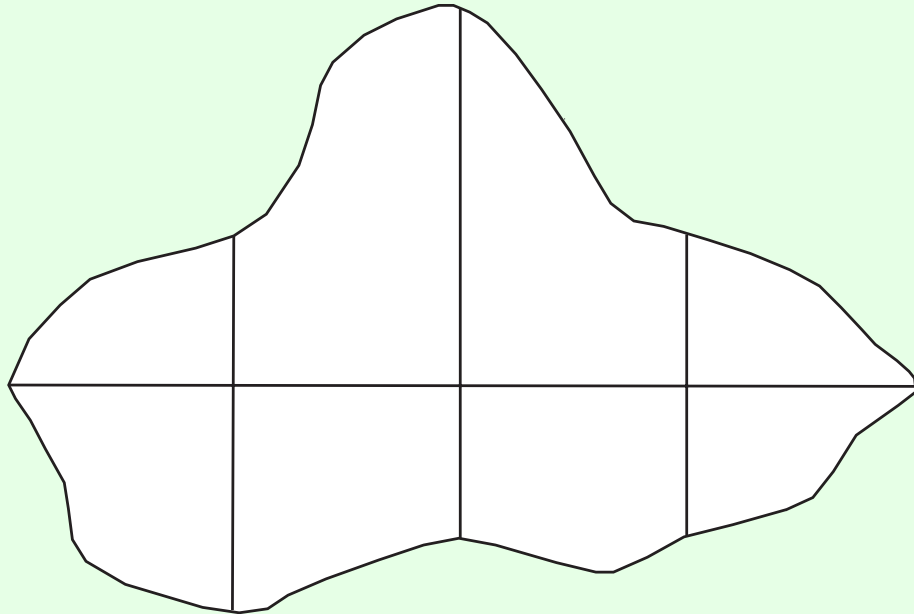


AREA & VOLUME (Q 1, PAPER 2)

LESSON NO. 2: SIMPSON'S RULE

2007

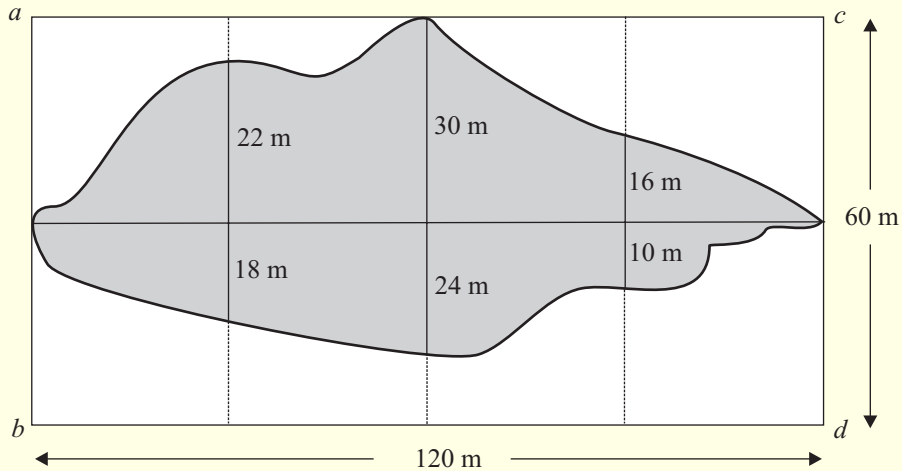
- 1 (b) In order to estimate the area of the irregular shape below, a horizontal line is drawn across the widest part of the shape and three offsets (perpendicular lines) are drawn at equal intervals along this line.



- (i) Measure the horizontal line and the offsets, in centimetres.
Make a rough sketch of the shape in your answerbook and record the measurements on it.
- (ii) Use Simpson's Rule with these measurements to estimate the area of the shape.

2006

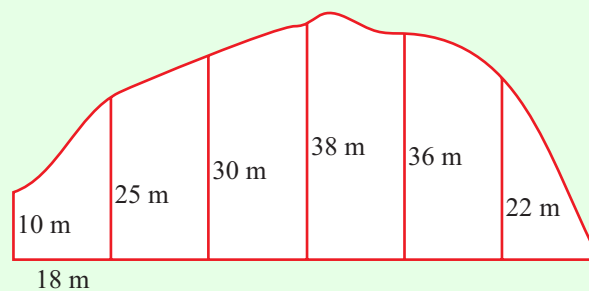
- 1 (b) Archaeologists excavating a rectangular plot $abcd$ measuring 120 m by 60 m divided the plot into eight square sections as shown on the diagram. At the end of the first phase of the work the shaded area had been excavated. To estimate the area excavated, perpendicular measurements were made to the edge of the excavated area, as shown.



- (i) Use Simpson's Rule to estimate the area excavated.
- (ii) Express the excavated area as a percentage of the total area, correct to the nearest whole number.

2005

- 1 (b) The sketch shows a lake bounded on one side by a straight dam.

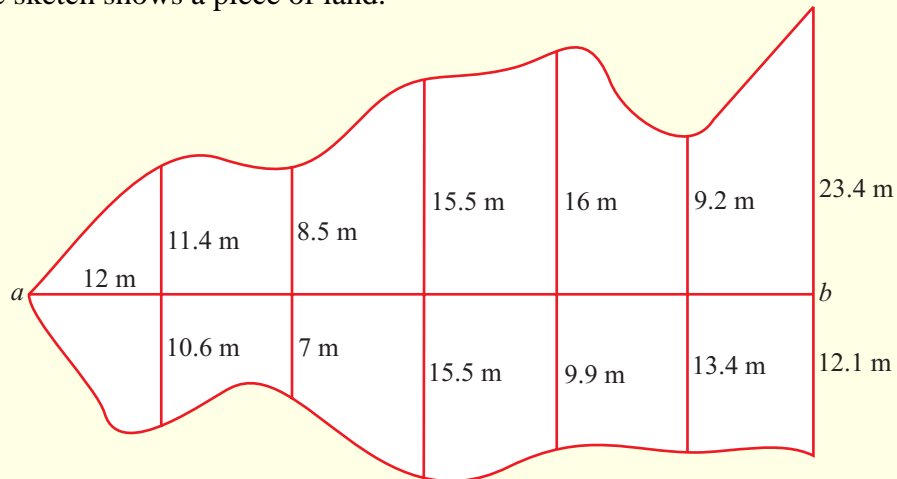


At equal intervals of 18 m along the dam, perpendicular measurements are made to the opposite bank, as shown on the sketch.

- (i) Use Simpson's Rule to estimate the area of the lake.
- (ii) If the lake contains $15\,000\text{ m}^3$ of water, calculate the average depth of water in the lake, correct to the nearest metre.

2004

1 (b) The sketch shows a piece of land.

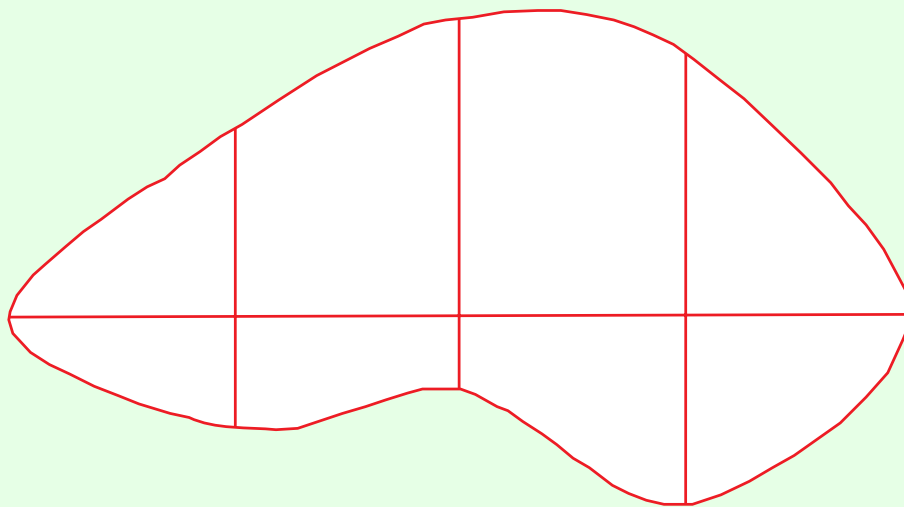


At equal intervals of 12 m along $[ab]$, perpendicular measurements are made to the boundary, as shown on the sketch.

Use Simpson's Rule to estimate the area of the piece of land.

2003

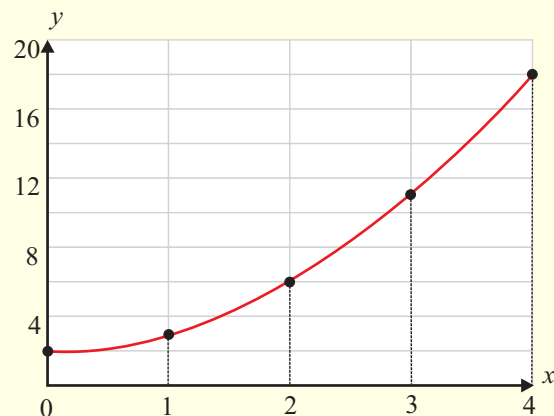
1 (b) In order to estimate the area of the irregular shape below, a horizontal line is drawn across the widest part of the shape and three offsets (perpendicular lines) are drawn at equal intervals along this line.



- (i) Measure the horizontal line and the offsets as accurately as you can. Make a rough sketch of the shape in your answerbook and record the measurements on it.
- (ii) Use Simpson's Rule with these measurements to estimate the area of the shape.

2002

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



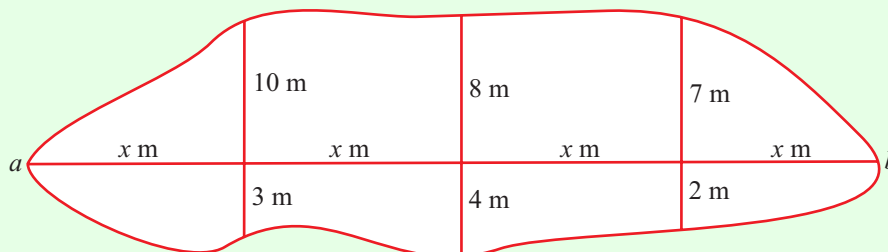
(i) Copy the following table. Then, complete it using the equation of the curve:

x	0	1	2	3	4
y					

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

2001

1 (b) The sketch shows a flood caused by a leaking underground pipe that runs from a to b .



At equal intervals of x m along $[ab]$ perpendicular measurements are made to the edges of the flood. The measurements to the top edge are 10 m, 8 m and 7 m. The measurements to the bottom edge are 3 m, 4 m and 2 m. At a and b the measurements are 0 m.

Using Simpson's Rule the area of the flood is estimated to be 672 m^2 .

Find x and hence, write down the length of the pipe.

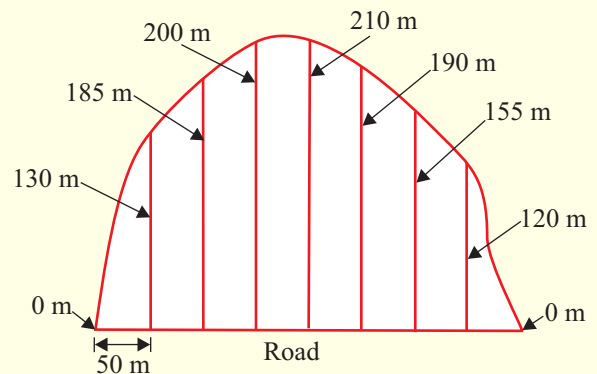
2000

- 1 (b) The sketch shows a piece of land covered by forest which lies on one side of a straight road.

At equal intervals of 50 m along the road, perpendicular measurements of 130 m, 185 m, 200 m, 210 m, 190 m, 155 m and 120 m are made to the forest boundary.

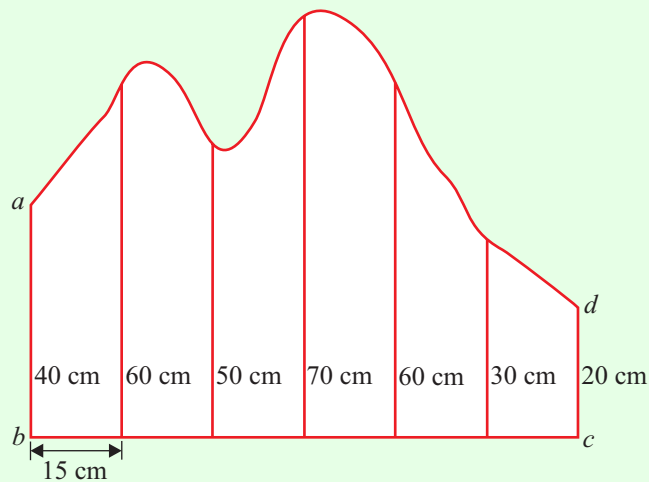
Use Simpson's Rule to estimate the area of land covered by the forest.
[See Tables, page 42.]

Give your answer in hectares.
[Note: 1 hectare = 10 000 m².]



1999

- 1 (b) A sketch of a piece of land *abcd* is shown.

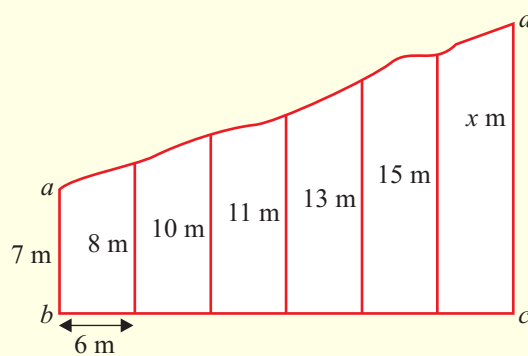


At equal intervals of 15 m along $[bc]$, perpendicular measurements of 40 m, 60 m, 50 m, 70 m, 60 m, 30 m and 20 m are made to the top boundary.

Use Simpson's Rule to estimate the area of the piece of land. [See Tables, page 42].

1998

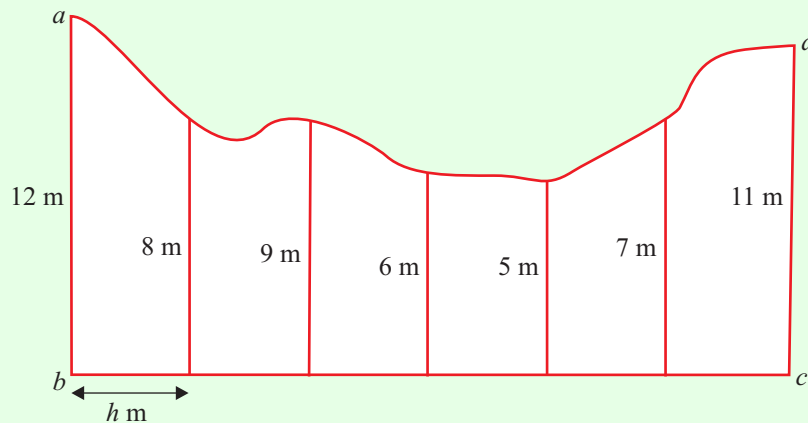
- 1 (b) The sketch shows a field $abcd$ which has one uneven edge. At equal intervals of 6 m along $[bc]$ perpendicular measurements of 7 m, 8 m, 10 m, 11 m, 13 m, 15 m and x m are made to the top of the field.



Using Simpson's Rule the area of the field is calculated to be 410 m^2 . Calculate the value of x . [See Tables, page 42.]

1997

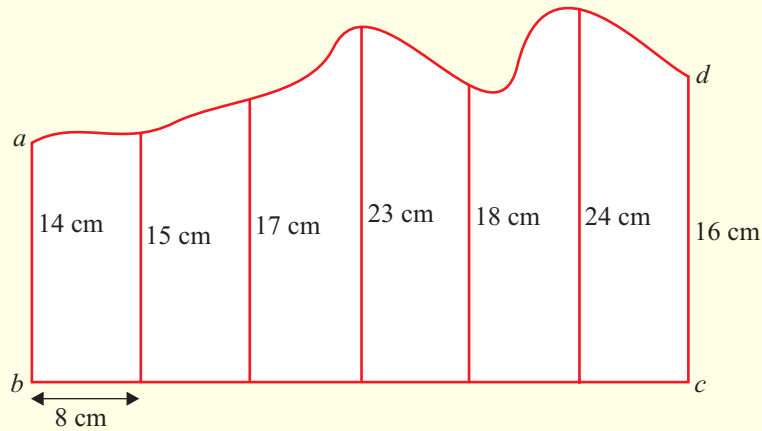
- 1 (b) The diagram shows a sketch of a piece of paper $abcd$ with one uneven edge. At equal intervals of h cm along $[bc]$, perpendicular measurements of 12 cm, 8 cm, 9 cm, 6 cm, 5 cm, 7 cm and 11 cm are made to the top edge.



Use Simpson's Rule the area of the piece of paper is estimated to be 180 cm^2 . Calculate the value of h . [See Tables, page 42.]

1996

- 1 (b) A sketch to estimate the area of a building site $abcd$ is shown. At intervals of 8 m along $[bc]$, perpendicular measurements of 14 m, 15 m, 17 m, 23 m, 18 m, 24 m and 16 m are made to the top boundary.



Use Simpson's Rule to estimate the area of the building site.
[See Tables, page 42].

ANSWERS

- 2007** 1 (b) (ii) 50 cm^2
2006 1 (b) (i) 3720 m^2 (ii) 52%
2005 1 (b) (i) $2,892 \text{ m}^2$ (ii) 5 m
2004 1 (b) 1682.8 m^2
2003 1 (b) (ii) 50 cm^2
2002 1 (b) (i)

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

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

- 2001** 1 (b) 18 m, 72 m
2000 1 (b) 6.1 hectares
1999 1 (b) 4600 cm^2
1998 1 (b) 16 m
1997 1 (b) 4 cm
1996 1 (b) 928 cm^3