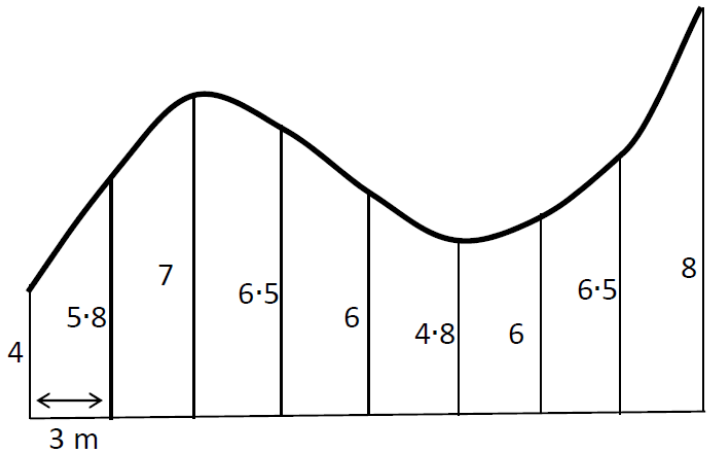
Area and Volume – The Trapezoidal Rule

Project Maths Exam Questions

2017 LCOL Paper 1 – Question 5

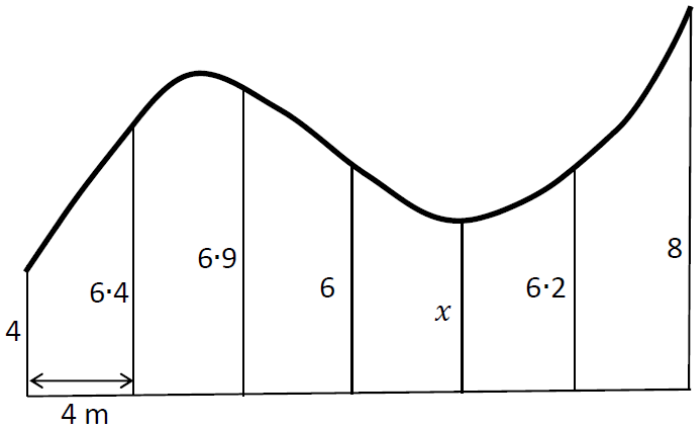
A field is divided into eight sections as shown below. The width of each section is 3 metres. The height, in metres, of each section is given in the diagram.



(a) Use the Trapezoidal rule to estimate the area of the field.

The area of the same field was re-estimated by applying the Trapezoidal rule again.

This time, a different section width (4 m) and a different set of section heights were used, as shown below. The area was found to be 145·6 m^2.

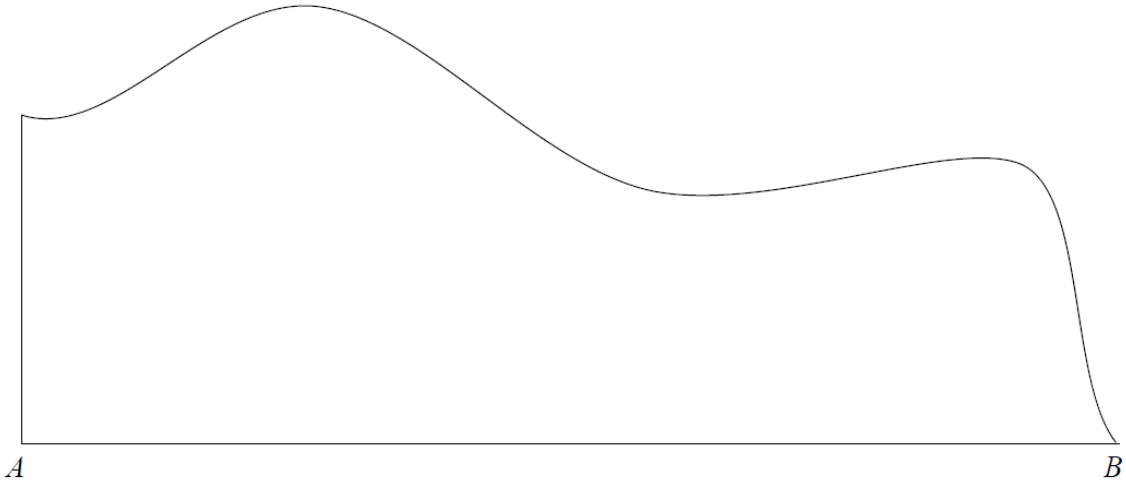


(b) Use this information to find the value of the height marked x on the diagram.

2014 LCOL Sample Paper 2 – Question 5

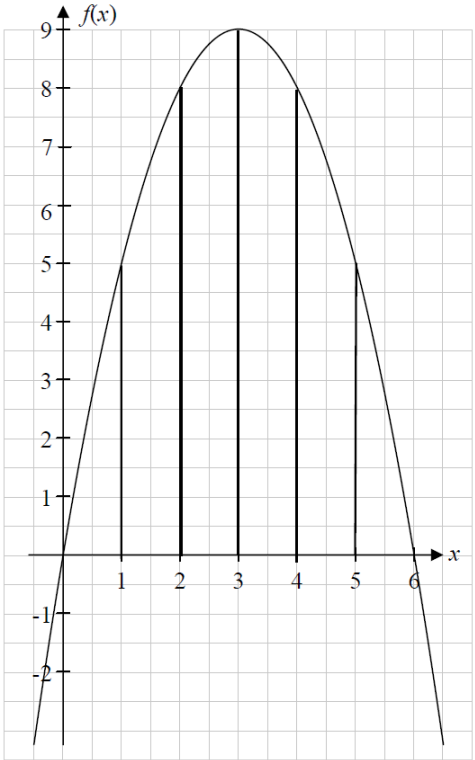
The diagram below shows a shape with two straight edges and one irregular edge. By dividing the edge $[AB]$ into five equal intervals, use the trapezoidal rule to estimate the area of the shape.

Record your constructions and measurements on the diagram. Give your answer correct to the nearest cm^2.



2013 LCOL Paper 1 – Question 2 (a)

The diagram shows the graph of the function $f(x) = 6x - x^2$ in the domain $0 \leq x \leq 6,\ \ x \in R$.



(a) Find $f(0)$, $f(1)$, $f(2)$, $f(3)$, $f(4)$, $f(5)$ and $f(6)$.

Hence, complete the table below.

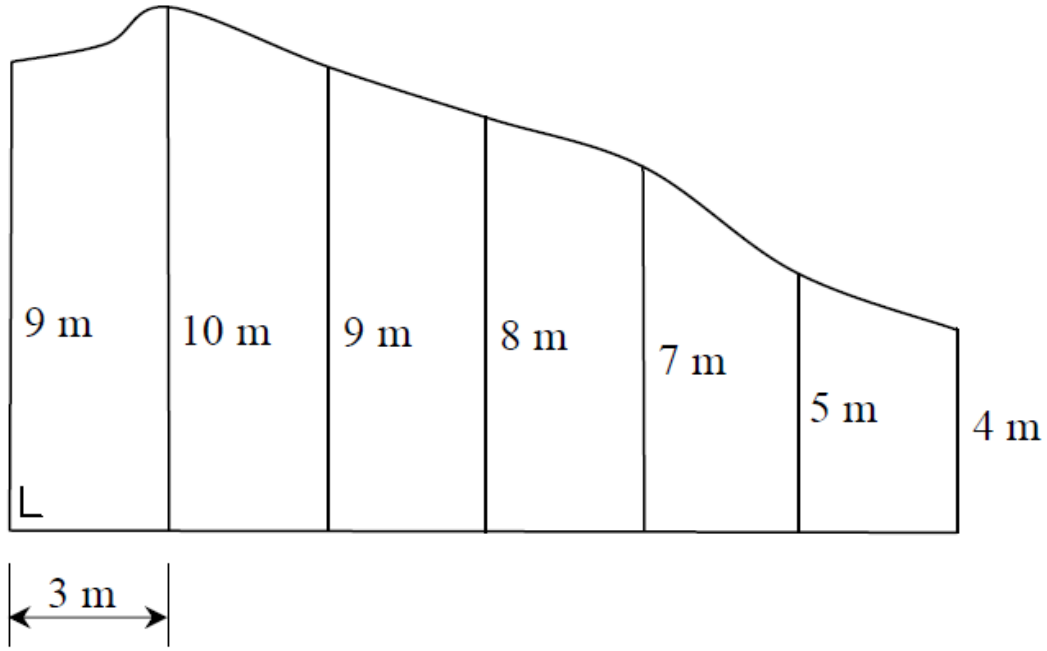
x	0	1	2	3	4	5	6
$f(x)$							

(b) Use the trapezoidal rule to estimate the area of the region enclosed between the curve and the x-axis in the given domain.

2012 LCOL Sample Paper 2 – Question 8 (b)

The sketch shows the garden of a house. At equal intervals of 3 m along one side, perpendicular measurements are made to the boundary, as shown on the sketch.

(i) Use the Trapezoidal Rule **(now the Simpson's Rule)** to estimate the area of the garden.



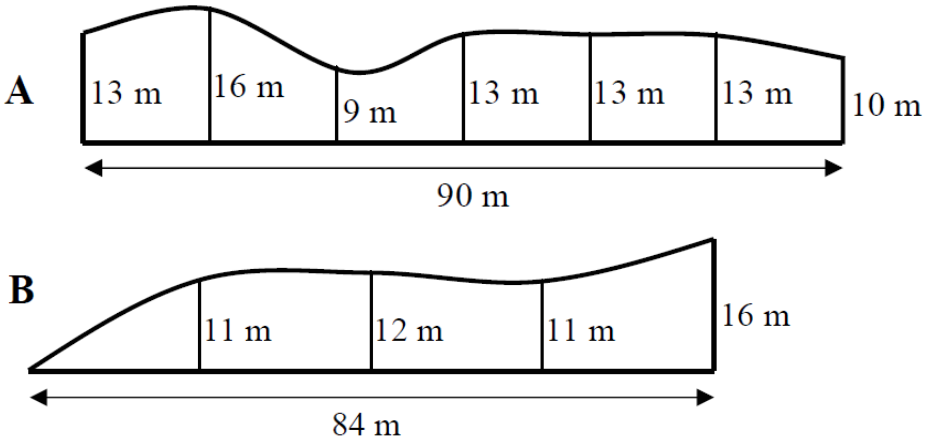
The owner of the house digs an ornamental pond in the garden. The surface area of the pond is 7 m^2.

(ii) What percentage of the area of the garden is taken up by the pond?

Give your answer correct to the nearest percent.

2010 NCAA LCOL Paper 2 – Question 1 (b)

Use Simpson's Rule (now the Trapezoidal Rule) to determine which of the shapes A or B below has the greater area, and by how much.



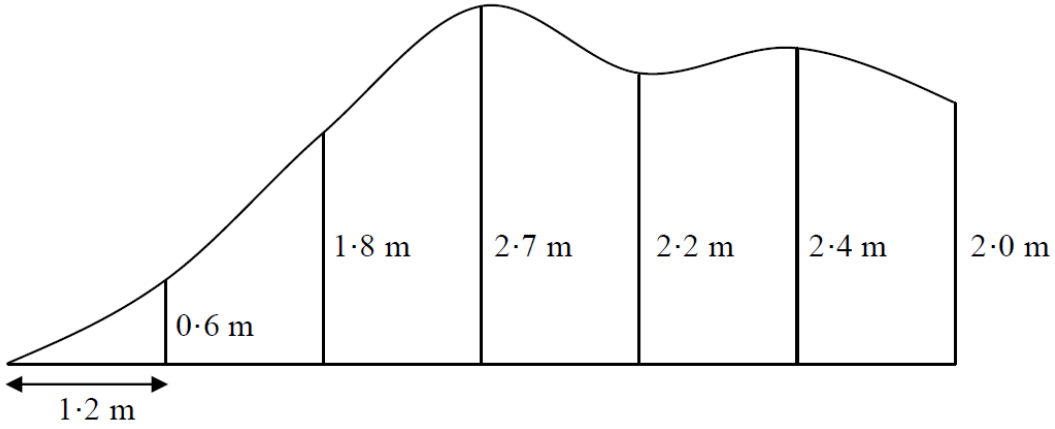
Relevant Old Course Questions

2011 LCOL Paper 2 – Question 1 (b)

The sketch shows a section of a wall that is to be painted.

At equal intervals of 1.2 m along the bottom of the wall, perpendicular measurements are made to the uneven edge, as shown on the sketch.

(i) Use the Trapezoidal Rule to estimate the area of the section of the wall.

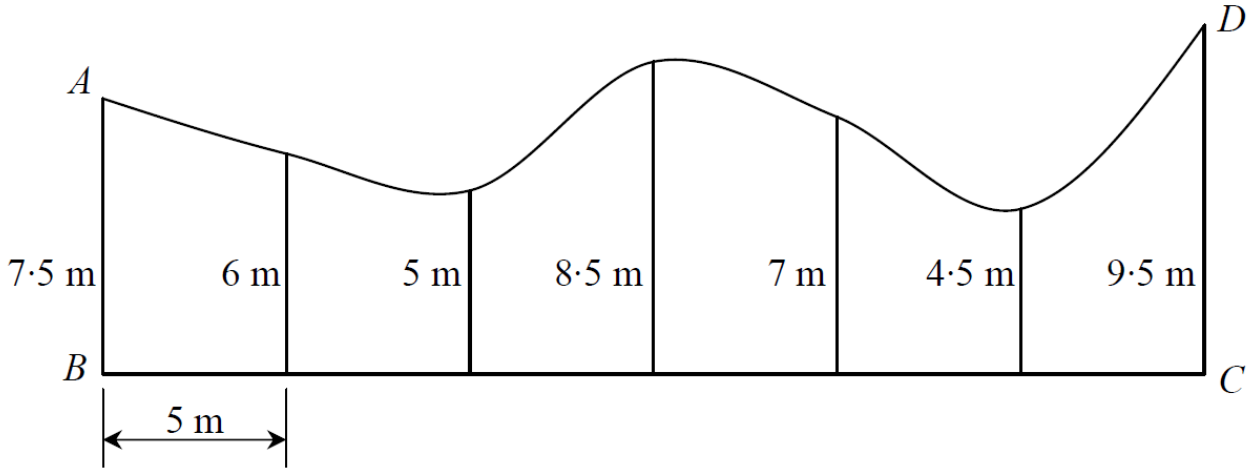


(ii) How many litres of paint are required to paint the section of the wall, if 1 litre of paint covers an area of 2.2 m^2? Give your answer correct to the nearest litre.

2010 LCOL Paper 2 – Question 1 (b)

The diagram shows a sketch of a field $ABCD$ that has one uneven edge. At equal intervals of 5 m along , perpendicular measurements are made to the uneven edge, as shown on the sketch.

(i) Use Trapezoidal Rule to estimate the area of the field.

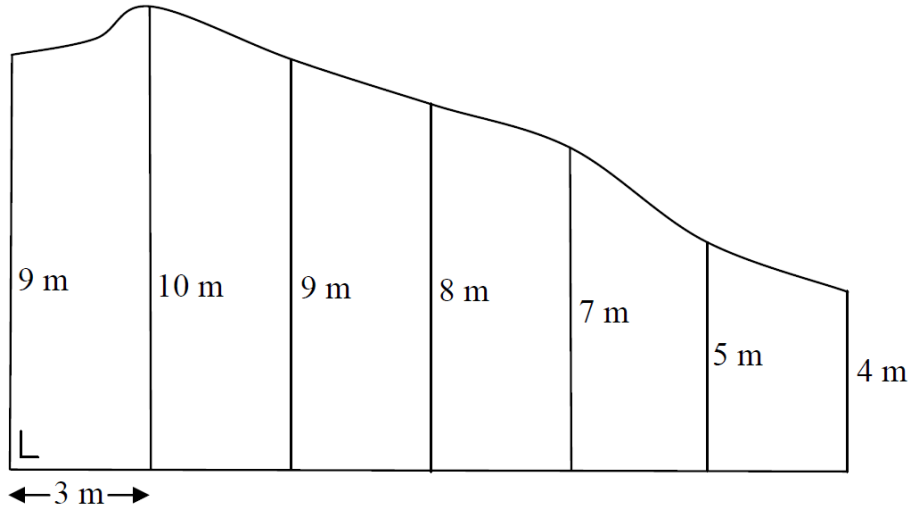


(ii) The actual area of the field is 200 m^2. Find the percentage error in the estimate.

2009 LCOL Paper 2 – Question 1 (b)

The sketch shows the garden of a house. At equal intervals of 3 m along one side, perpendicular measurements are made to the boundary, as shown on the sketch.

(i) Use Trapezoidal rule to estimate the area of the garden.



The owner of the house digs an ornamental pond in the garden.

The surface area of the pond is 7 m^2 .

(ii) What percentage of the area of the garden is taken up by the pond?

Give your answer correct to the nearest percent.

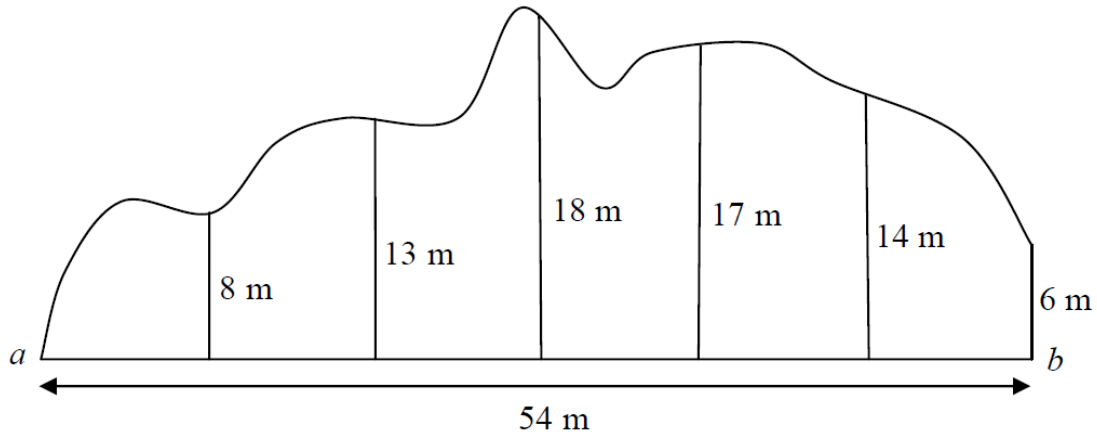
2008 LCOL Paper 2 – Question 1 (b)

The sketch shows a piece of land which borders the side of a straight road $[ab]$.

The length of $[ab]$ is 54 m.

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

(i) Use Trapezoidal Rule to estimate the area of the piece of land.



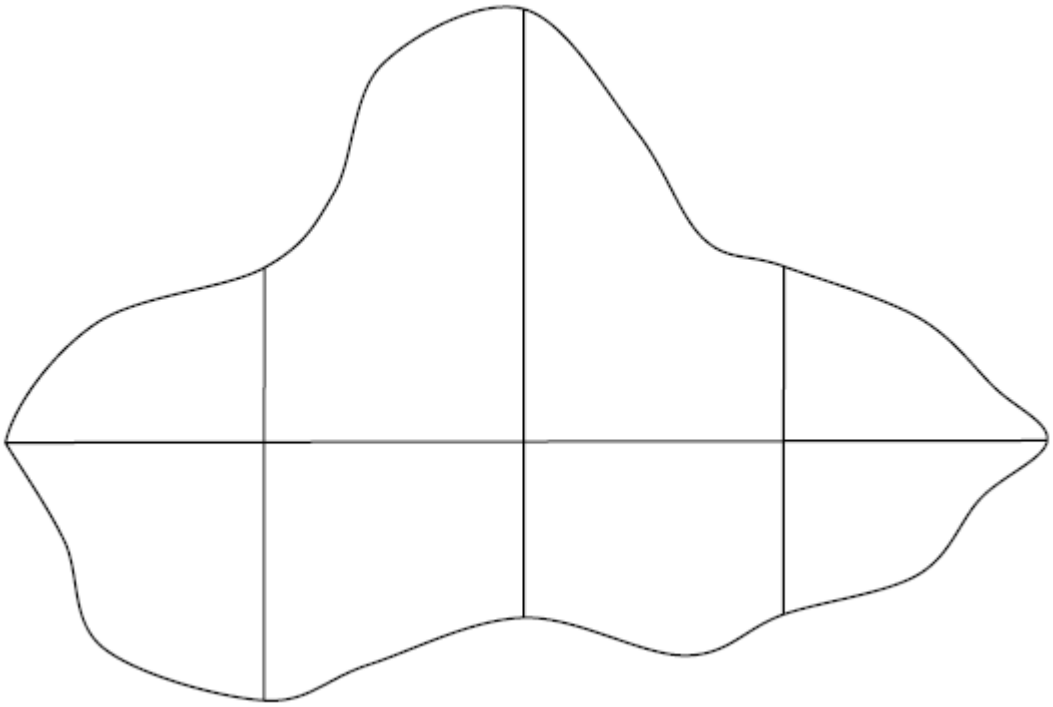
(ii) The land is valued at €480 000 per hectare. Find the value of the piece of land.

Note: 1 hectare = 10 000 m^2 .

2007 LCOL Paper 2 – Question 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. Measure the horizontal line and the offsets, in centimetres.

(i) Make a rough sketch of the shape in your answerbook and record the measurements on it.

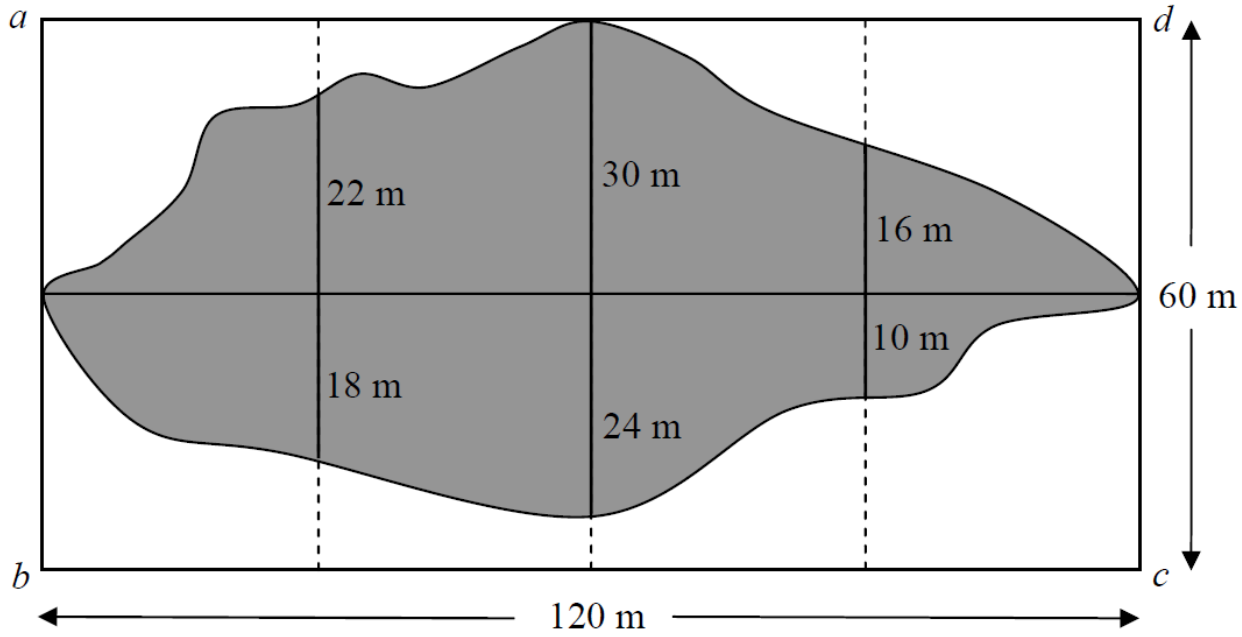


(ii) Use Trapezoidal Rule with these measurements to estimate the area of the shape.

2006 LCOL Paper 2 – Question 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 the Trapezoidal Rule to estimate the area excavated.



(ii) Express the excavated area as a percentage of the total area, correct to the nearest whole number.