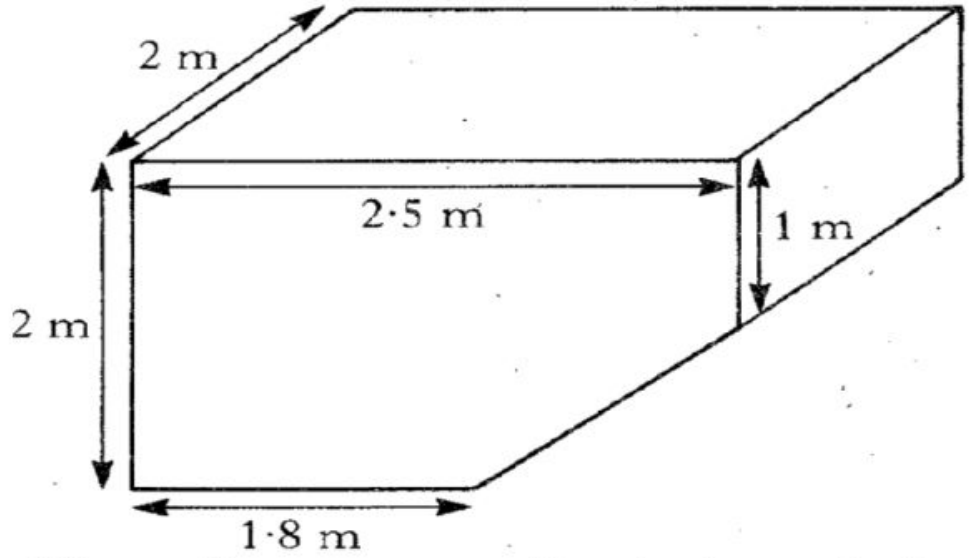
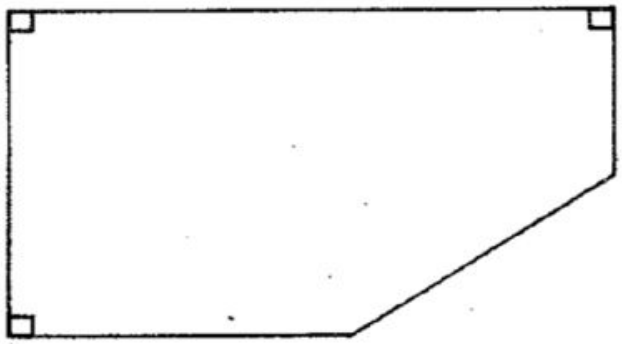
A bottle bank is prism shaped, as shown in figure 1.

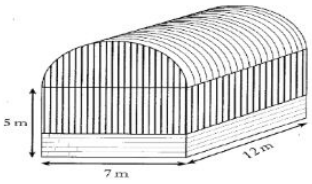


The uniform cross-section is shown in figure 2.



Find the volume of the bottle bank.

Past Paper Questions – National 5 Mathematics
Topic: Volume



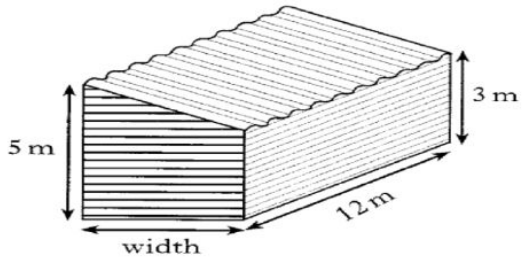
25.25

The cross-section of the storage barn consists of a rectangle measuring 7 metres by 5 metres and a semi-circle of radius 3·5 metres.

(*a*) Find the volume of the storage barn.

Give your answer in cubic metres, **correct to 2 significant figures**.

(*b*) An extension to the barn is planned to increase the volume by 200 cubic metres.

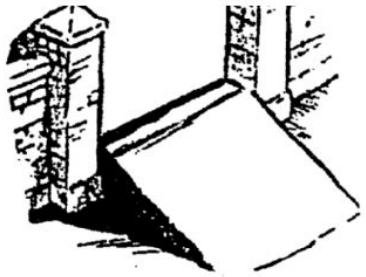


The uniform cross-section of the extension consists of a rectangle and a right-angled triangle.

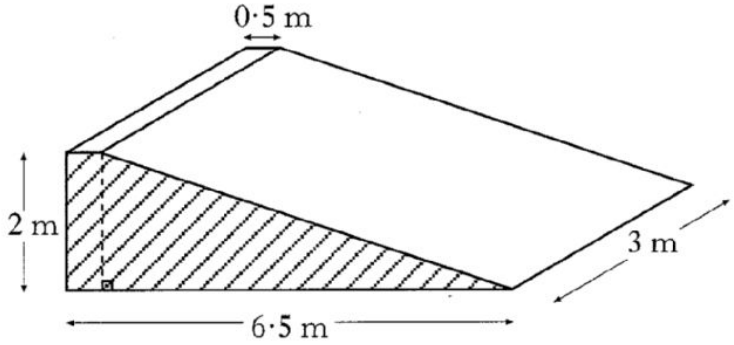
Find the width of the extension.

25.26

A ramp is being made from concrete.

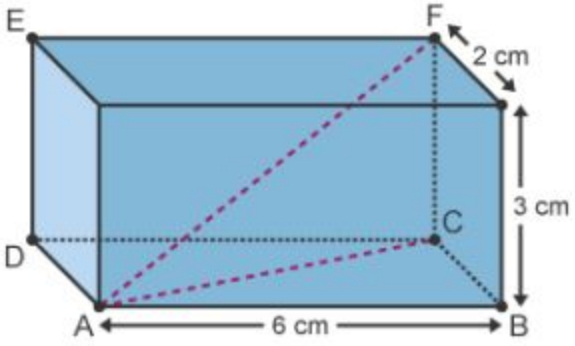


The uniform cross-section of the ramp consists of a right-angled triangle and a rectangle as shaded in the diagram below.



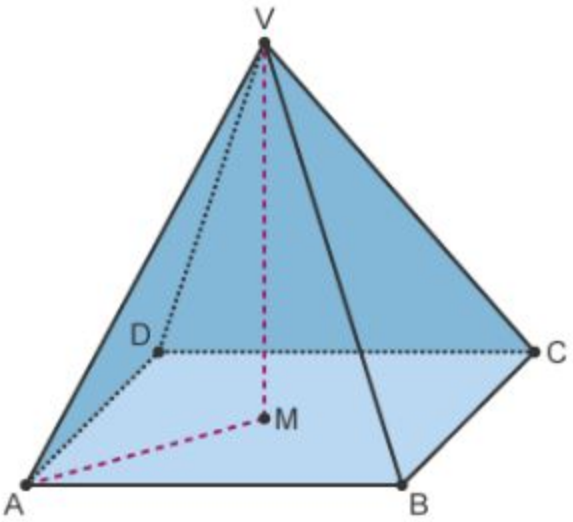
Find the volume of concrete required to make the ramp.

This cuboid has side lengths of 2cm, 3cm and 6cm.



Work out the length of the diagonal AF.

Work out the vertical height (VM) in this square-based pyramid and give your answer to one decimal place.



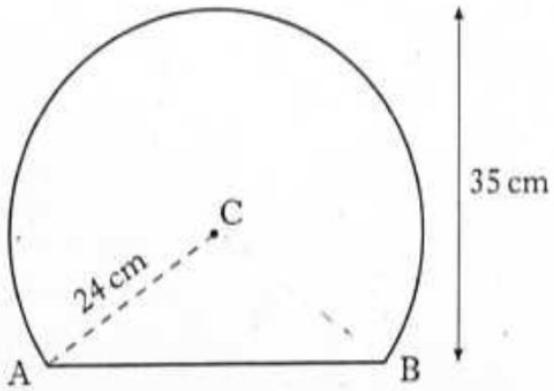
The square base ABCD has side lengths of 5cm.

Lengths VA, VB, VC and VD are each 8cm.

M is the mid point of the square base.

21.10

A mirror is shaped like part of a circle.

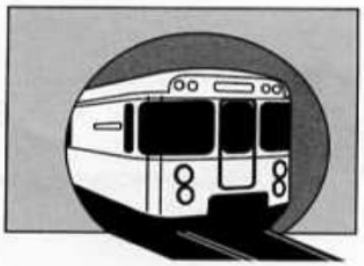


The radius of the circle, centre C, is 24 centimetres.
The height of the mirror is 35 centimetres.

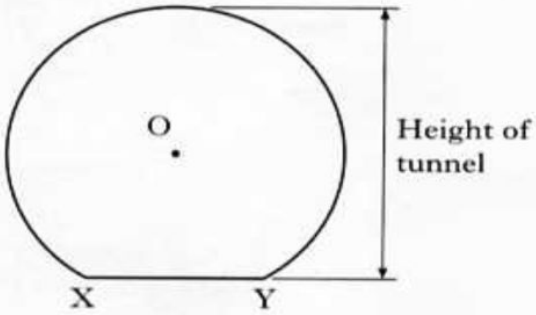
Calculate the length of the base of the mirror, represented in the diagram by AB.

21.12

A railway goes through an underground tunnel.



The diagram below shows the cross-section of the tunnel. It consists of part of a circle with a horizontal base.

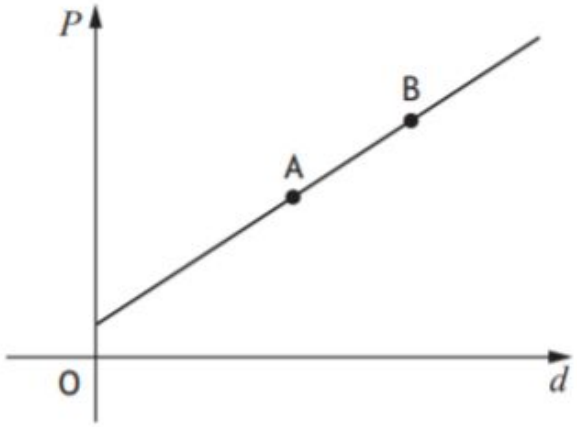


- The centre of the circle is O.
- XY is a chord of the circle.
- XY is 1·8 metres.
- The radius of the circle is 1·7 metres.

Find the height of the tunnel.

The cost of a journey with Tom's Taxis depends on the distance travelled.

The graph below shows the cost, P pounds, of a journey with Tom's Taxis against the distance travelled, d miles.



Point A represents a journey of 8 miles which costs £14.

Point B represents a journey of 12 miles which costs £20.

(a) Find the equation of the line in terms of P and d.
Give the equation in its simplest form.

(b) Calculate the cost of a journey of 5 miles.

A straight line has equation $2x - 5y = 20$.

Find the coordinates of the point where this line crosses the y-axis.

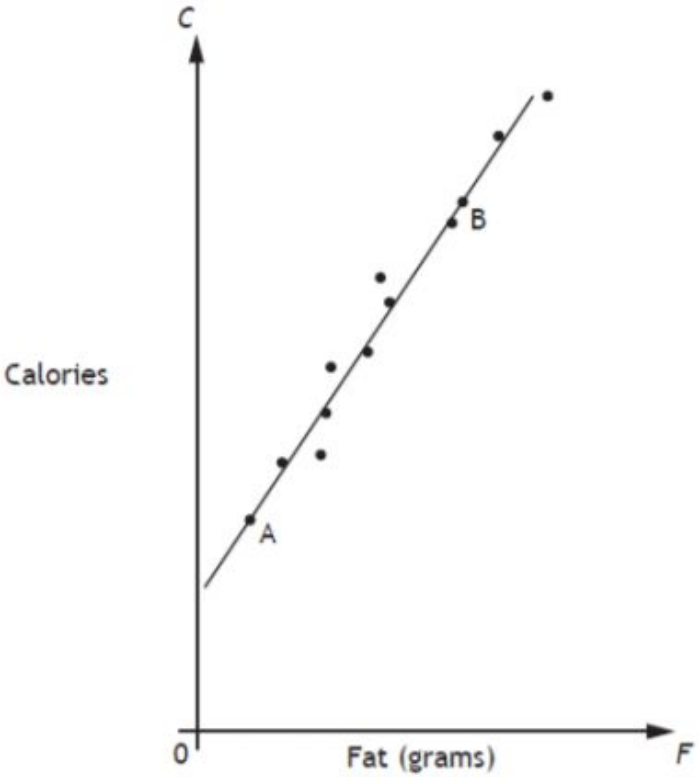
11. A straight line has equation $2y + 3x = 12$.

(*a*) Find the gradient of this line.

(*b*) The line crosses the y-axis at $(0, c)$.
Find the value of c.

6. McGregor's Burgers sells fast food.

The graph shows the relationship between the amount of fat, F grams, and the number of calories, C, in some of their sandwiches.



A line of best fit has been drawn.

Point A represents a sandwich which has 5 grams of fat and 200 calories.

Point B represents a sandwich which has 25 grams of fat and 500 calories.

(a) Find the equation of the line of best fit in terms of F and C. 3

(b) A Super Deluxe sandwich contains 40 grams of fat.

Use your answer to part (a) to estimate the number of calories this sandwich contains.

Show your working. 1

11. (a) A straight line has equation $4x+3y=12$.

Find the gradient of this line. 2

(b) Find the coordinates of the point where this line crosses the x-axis. 2