GCSE · Edexcel · Maths

4 hours 54 questions

Exam Questions

Area & Perimeter

Perimeter / Area / Adding & Subtracting Areas / Problem Solving with Areas

Medium (19 questions)	/77
Hard (17 questions)	/69
Very Hard (18 questions)	/92
Total Marks	**/238**

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Medium Questions

1 The diagram shows the plan of a small field.

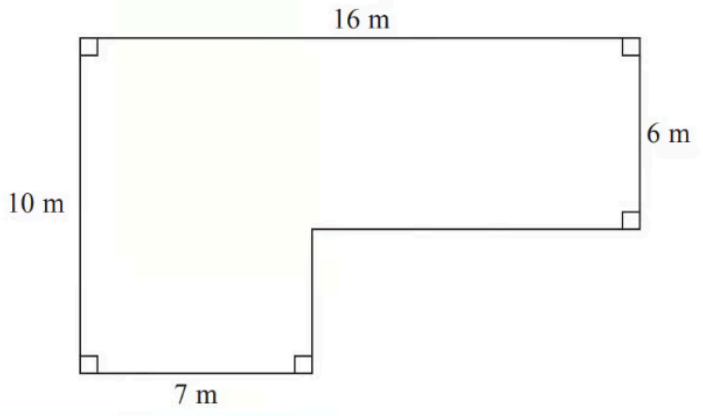


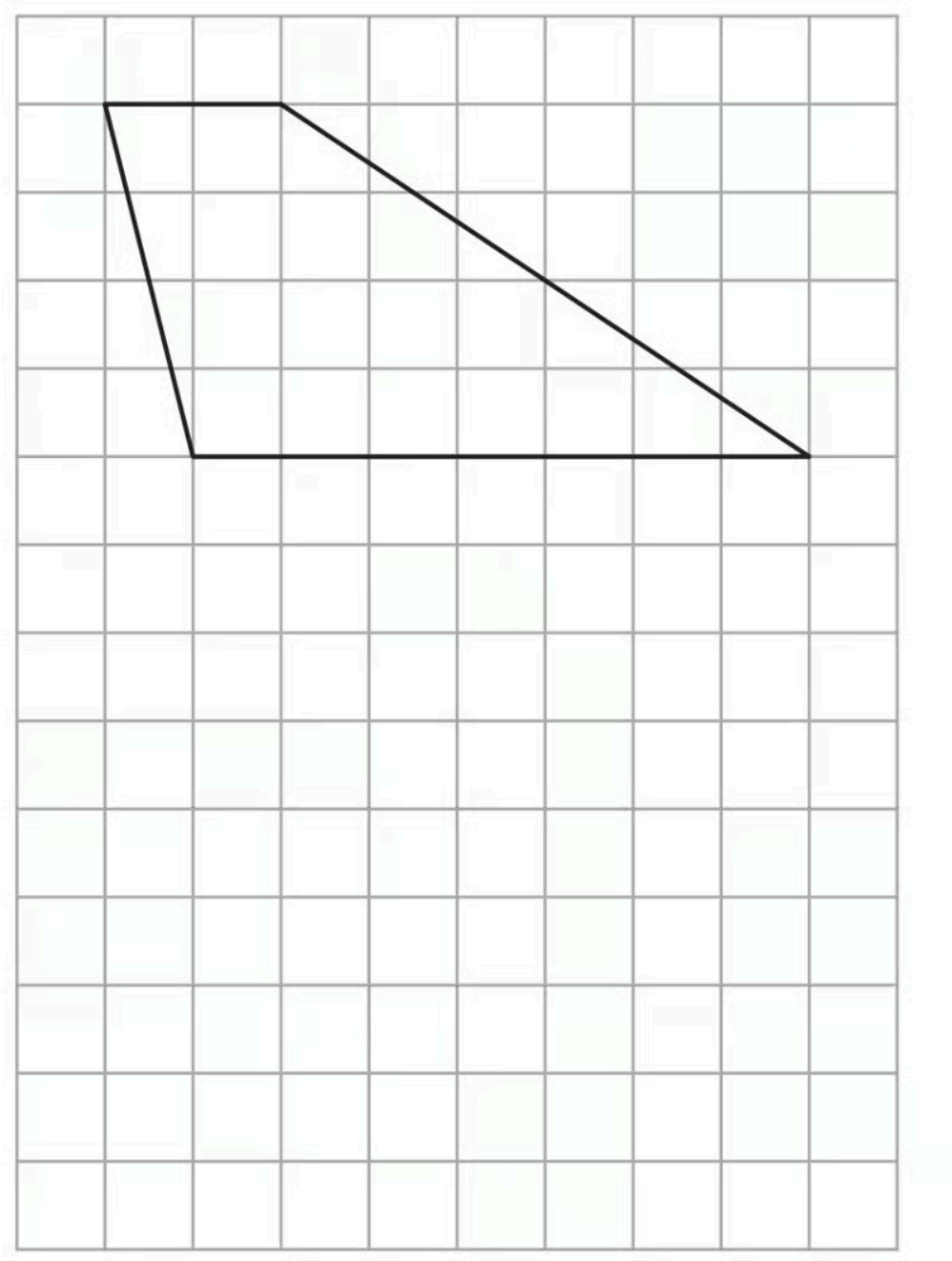
Diagram **NOT** accurately drawn

Kevin is going to keep some pigs in the field.
Each pig needs an area of 36 square metres.

Work out the greatest number of pigs Kevin can keep in the field.

(4 marks)

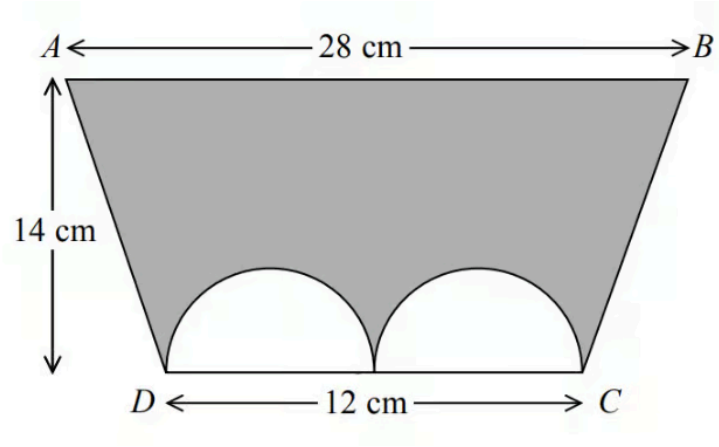
2 Here is a trapezium drawn on a centimetre grid.



On the grid, draw a triangle equal in area to this trapezium.

(2 marks)

3 The diagram shows a trapezium $ABCD$ and two identical semicircles.

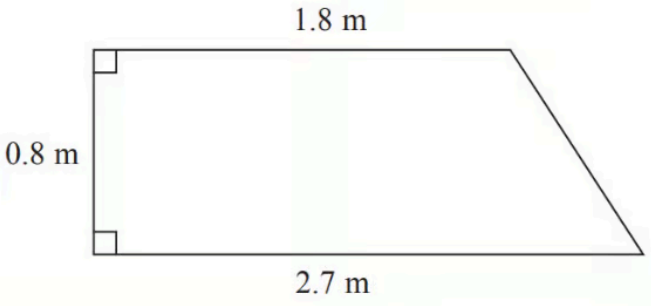


The centre of each semicircle is on DC.

Work out the area of the shaded region.
Give your answer correct to 3 significant figures.

(4 marks)

4 (a) The diagram shows a wall in the shape of a trapezium.



Karen is going to cover this part of the wall with tiles.
Each tile is rectangular, 15 cm by 7.5 cm.

Tiles are sold in packs.
There are 9 tiles in each pack.

Karen divides the area of this wall by the area of a tile to work out an estimate for the number of tiles she needs to buy.

Use Karen's method to work out the estimate for the number of packs of tiles she needs to buy.

(5 marks)

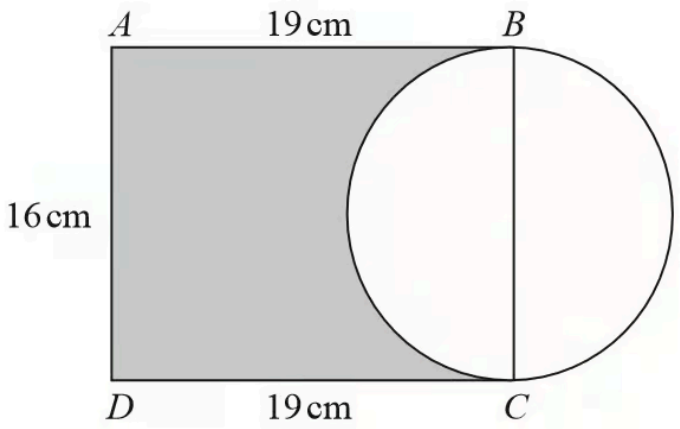
(b) Karen is advised to buy 10% more tiles than she estimated. Buying 10% more tiles will affect the number of the tiles Karen needs to buy.

She assumes she will need to buy 10% more packs of tiles.

Is Karen's assumption correct?
You must show your working.

(2 marks)

5 Here is a diagram showing a rectangle, $ABCD$, and a circle.



BC is a diameter of the circle.

Calculate the percentage of the area of the rectangle that is shaded.
Give your answer correct to 1 decimal place.

(4 marks)

6 The diagram shows a path around a pond.

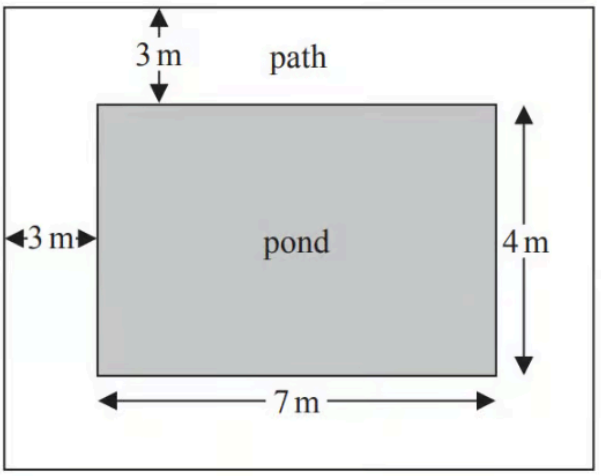


Diagram **NOT** accurately drawn

The pond is in the shape of a rectangle with length 7m and width 4m.
The path is 3m wide.

Ali is going to cover the path with gravel.
One bag of gravel will cover 10 m^2 of the path.

How many bags of gravel does Ali need to buy?
You must show your working.

(4 marks)

7 Mr Weaver's garden is in the shape of a rectangle.

In the garden

- there is a patio in the shape of a rectangle
- and two ponds in the shape of circles with diameter 3.8 m.

The rest of the garden is grass.

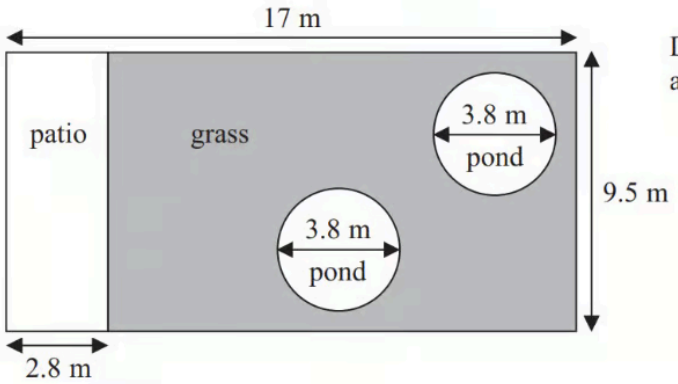


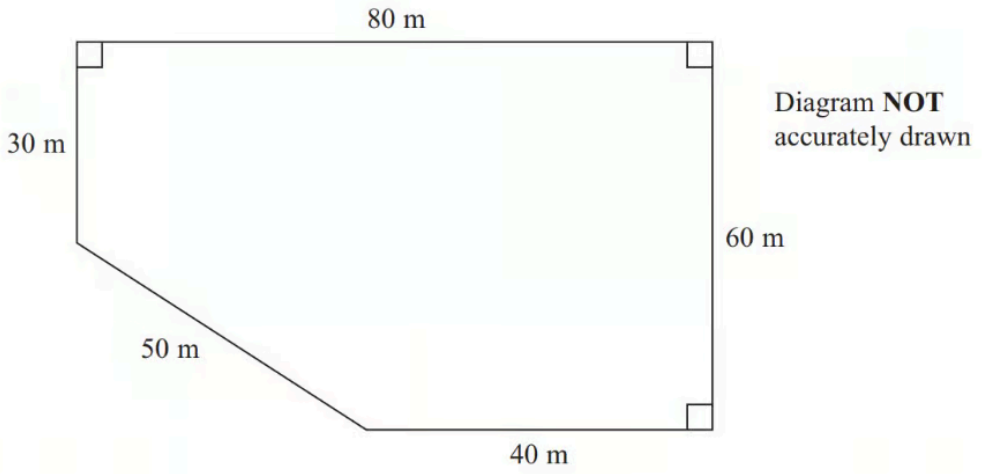
Diagram **NOT** accurately drawn

Mr Weaver is going to spread fertiliser over all the grass.
One box of fertiliser will cover 25 m^2 of grass.

How many boxes of fertiliser does Mr Weaver need?
You must show your working.

(5 marks)

8 The diagram shows the plan of a playground.



Bill is going to cover the playground with tarmac.
It costs £2.56 to cover each square metre with tarmac.

Work out the total cost of the tarmac Bill needs.

(4 marks)

9 The diagram shows the plan of a floor.

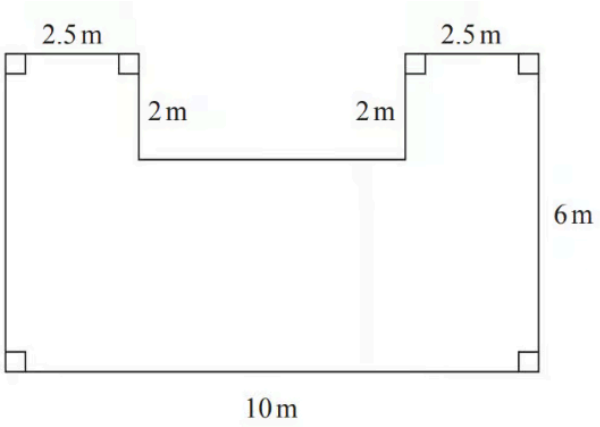


Diagram **NOT** accurately drawn

Angie is going to varnish the floor.

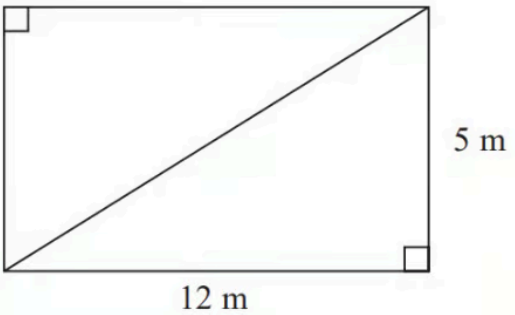
She needs 1 litre of varnish for $5m^2$ of floor. There are 2.5 litres of varnish in each tin of varnish.

Angie has 3 tins of varnish.

Does she have enough varnish for all the floor?
You must show all your working.

(5 marks)

10 This rectangular frame is made from 5 straight pieces of metal.



The weight of the metal is 1.5 kg per metre.

Work out the total weight of the metal in the frame.

(5 marks)

11 ABD is a right angled triangle.

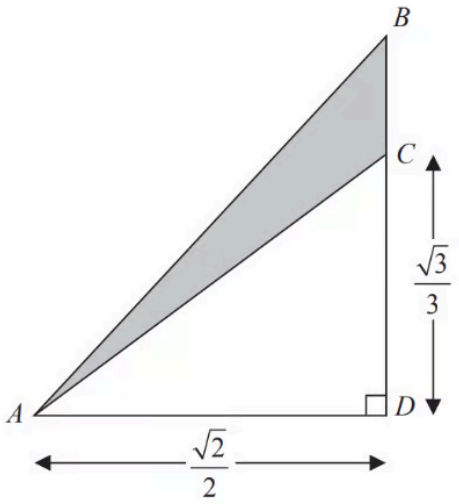


Diagram **NOT** accurately drawn

All measurements are given in centimetres.

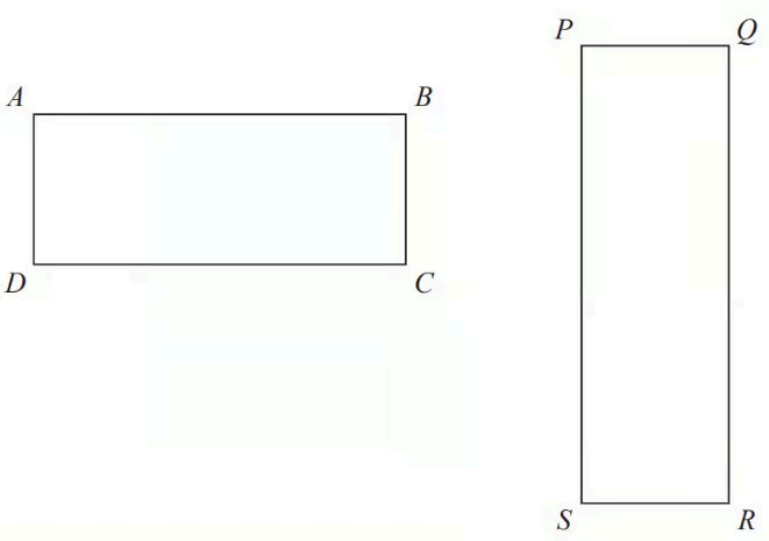
C is the point on BD such that $CD = \frac{\sqrt{3}}{3}$

$AD = BD = \frac{\sqrt{2}}{2}$

Work out the exact area, in cm^2, of the shaded region.

(3 marks)

12 Here are two rectangles.



$QR = 10\text{cm}$
$BC = PQ$

The perimeter of $ABCD$ is 26 cm.
The area of $PQRS$ is 45 cm^2.

Find the length of AB.

..... cm

(4 marks)

13 The shaded shape is made using three identical right-angled triangles and a square.

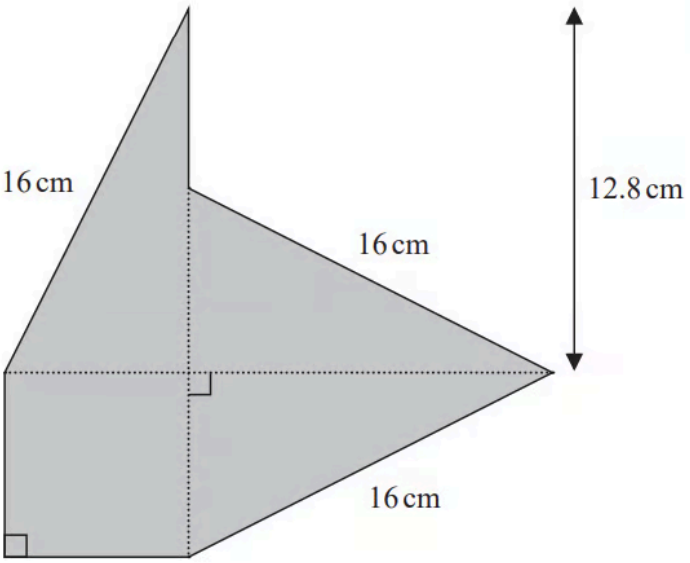


Diagram **NOT** accurately drawn

Work out the perimeter of the shaded shape.

..... cm

(4 marks)

14 Here is a hexagon $ABCDEF$.

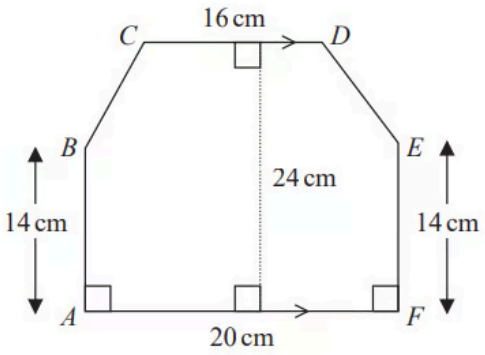


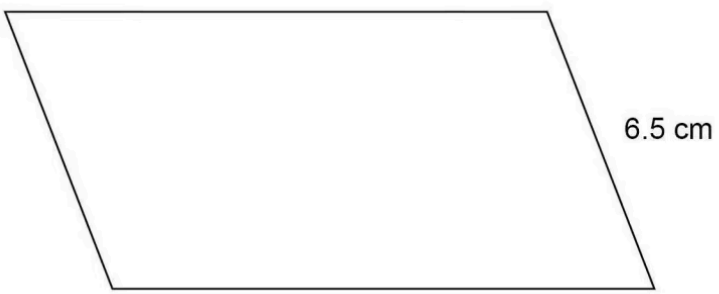
Diagram **NOT** accurately drawn

CD is parallel to AF.
Work out the area of hexagon $ABCDEF$.

..... cm^2

(4 marks)

15 The shorter side of a parallelogram has length 6.5 cm



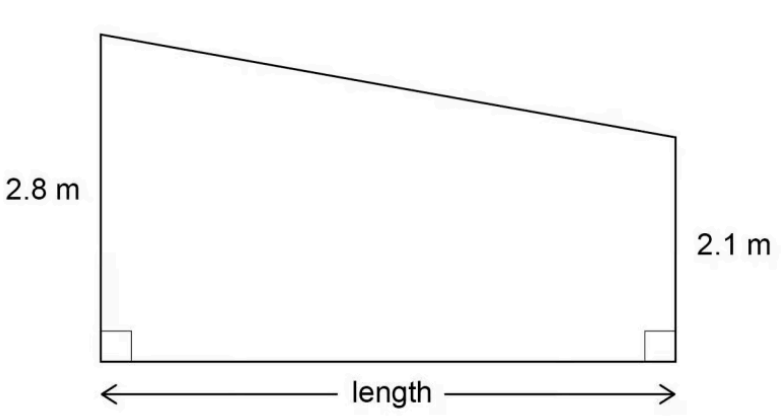
Not drawn accurately

The length of the shorter side is $\frac{1}{9}$ of the perimeter.

Work out the length of the longer side.

(3 marks)

16 The diagram shows a wall.

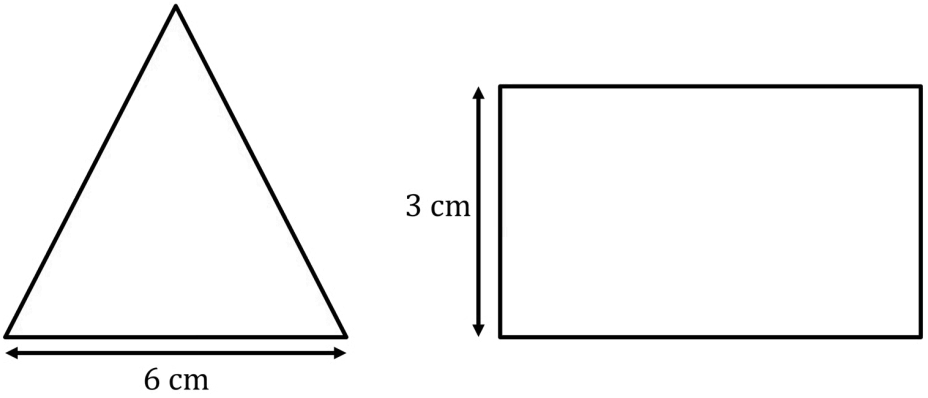


The area of the wall is 39.2 m^2
Work out the length of the wall.

.....m

(3 marks)

17 Here is a triangle and a rectangle.



The base of the triangle is 6 cm.

The height of the triangle is the same as the length of the rectangle.

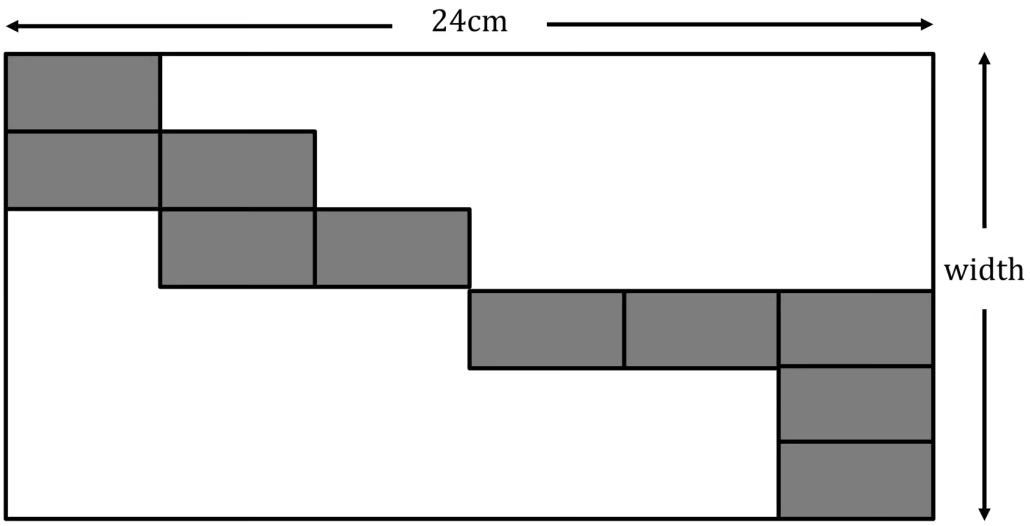
The width of the rectangle is 3 cm.

The perimeter of the rectangle is 36 cm.

Work out the area of the triangle.

(4 marks)

18 The diagram shows 12 identical grey rectangles inside a large rectangle.



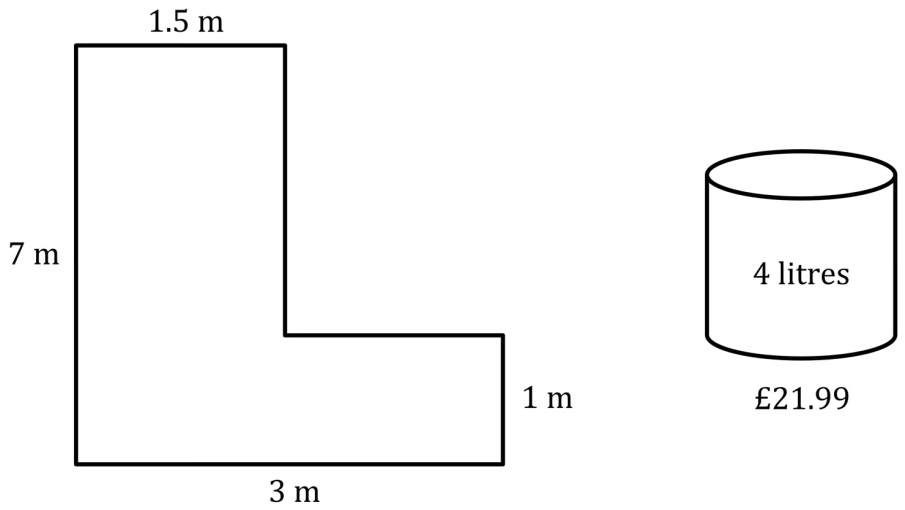
The length of the large rectangle is 24 cm.

The length of the grey rectangles is twice the width of the grey rectangles.

Work out the width of the large rectangle.

(3 marks)

19 The diagram shows a floor in the shape of a hexagon.



Sandra is going to paint the floor.

Each 4 litre tin of paint costs £21.99.

1 litre of paint covers an area of 2 m^2.

Sandra has £50 to spend on paint.

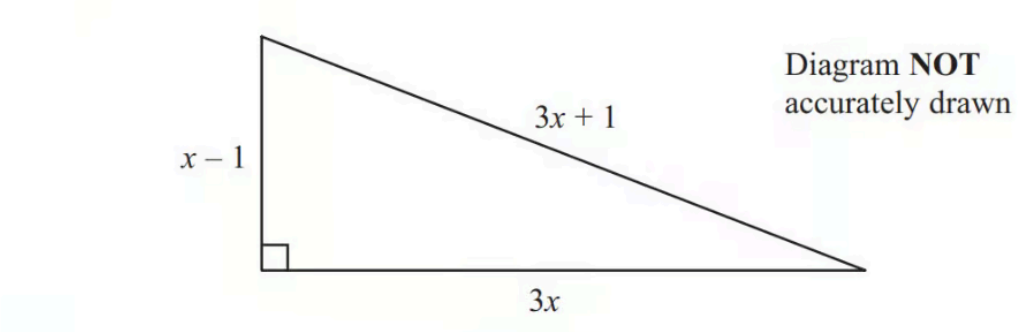
Has Sandra got enough money to buy all the paint she needs?

You must show how you get your answer.

(5 marks)

Hard Questions

1 The diagram shows a triangle.



In the diagram, all the measurements are in metres.

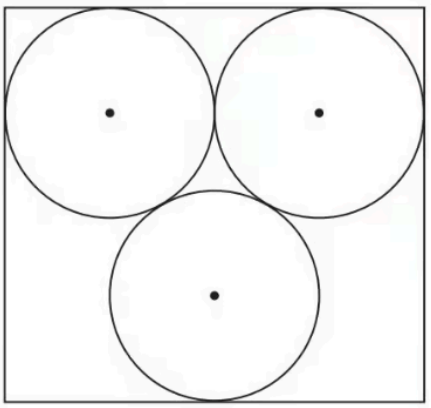
The perimeter of the triangle is 56 m.
The area of the triangle is A m^2.

Work out the value of A.

(4 marks)

2 The diagram shows 3 identical circles inside a rectangle.
Each circle touches the other two circles and the sides of the rectangle, as shown in the

diagram.

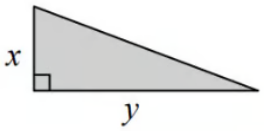


The radius of each circle is 24 mm.

Work out the area of the rectangle.
Give your answer correct to 3 significant figures.

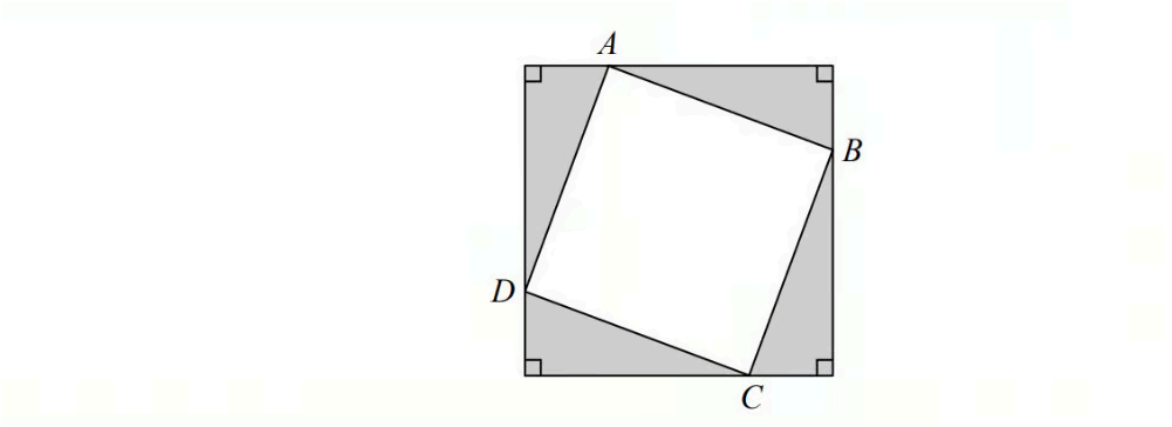
(4 marks)

3 Here is a right-angled triangle.



Four of these triangles are joined to enclose the square

$ABCD$ as shown below.



Show that the area of the square $ABCD$ is $x^2 + y^2$.

(3 marks)

4 Here is a diagram of Jim's garden.

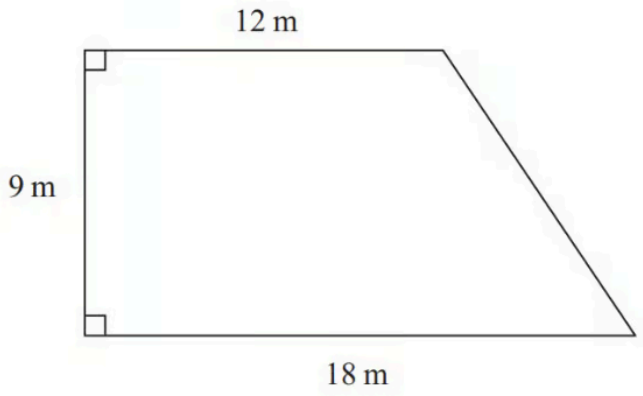


Diagram **NOT** accurately drawn

Jim wants to cover his garden with grass seed to make a lawn.

Grass seed is sold in bags.
There is enough grass seed in each bag to cover 20 m^2 of garden.

Each bag of grass seed costs £4.99

Work out the least cost of putting grass seed on Jim's garden.

(4 marks)

5 (a)

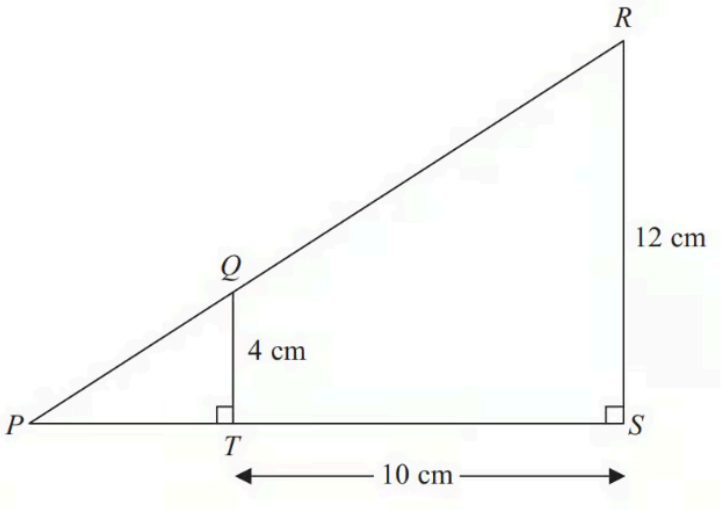


Diagram **NOT** accurately drawn

PQR and PTS are straight lines.
Angle PTQ = Angle $PSR = 90°$

$QT = 4\text{cm}$
$RS = 12\text{cm}$
$TS = 10\text{cm}$

Work out the area of the trapezium $QRST$.

(2 marks)

(b) Work out the length of PT.

(3 marks)

6 ABC is an isosceles triangle.

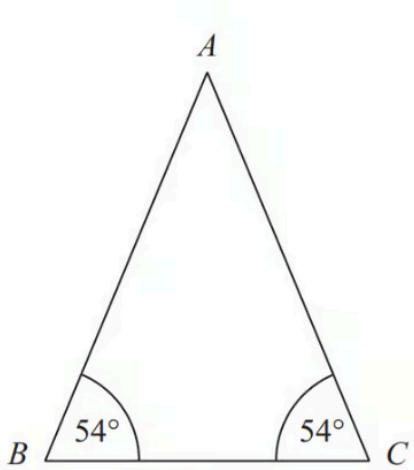


Diagram **NOT** accurately drawn

Work out the area of the triangle.
Give your answer correct to 3 significant figures.

(4 marks)

7 Here is a parallelogram.

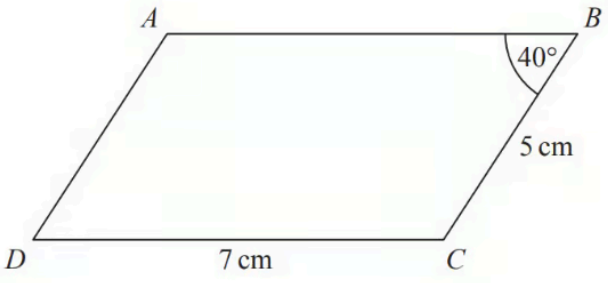


Diagram **NOT** accurately drawn

$DC = 7$ cm
$CB = 5$ cm

Angle ABC is $40°$

Work out the area of the parallelogram.
Give your answer correct to 1 decimal place.

(3 marks)

8 The diagram shows a triangle DEF inside a rectangle $ABCD$.

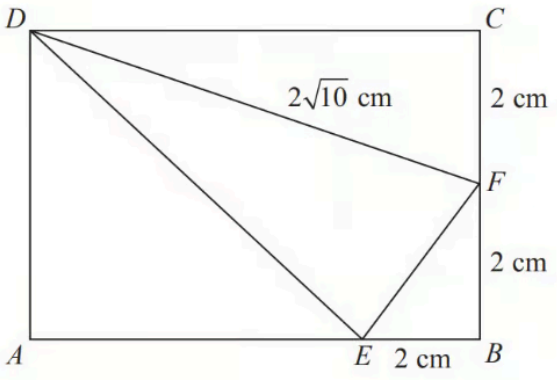


Diagram **NOT** accurately drawn

Show that the area of triangle DEF is 8 cm^2.
You must show all your working.

(4 marks)

9

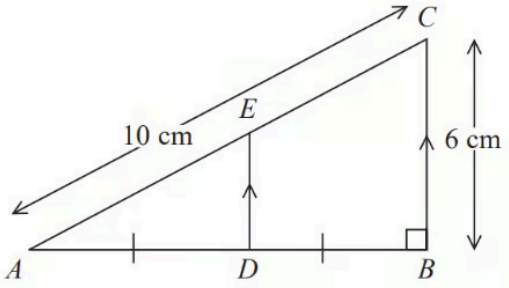


Diagram **NOT** accurately drawn

ADB and AEC are straight lines.
DE is parallel to BC.

Angle $ABC = 90°$

$AC = 10$ cm.
$BC = 6$ cm.

D is the midpoint of AB.

Work out the area of trapezium $BCED$.

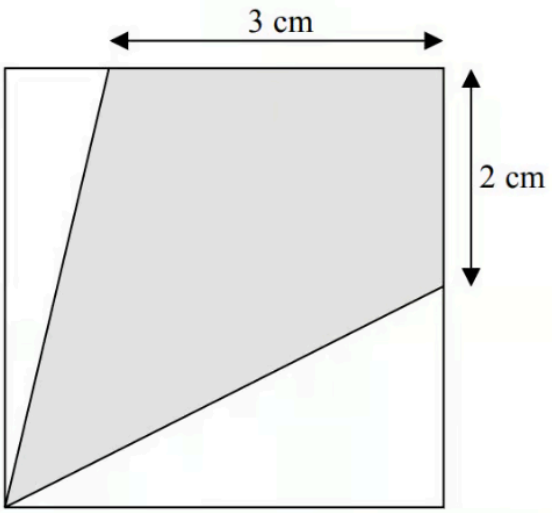
(4 marks)

10 The perimeter of a right-angled triangle is 72 cm.
The lengths of its sides are in the ratio 3 : 4 : 5.

Work out the area of the triangle.

(4 marks)

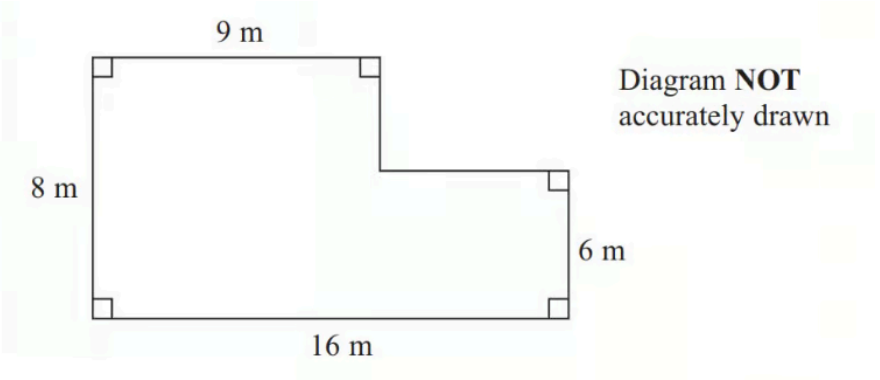
11 The diagram shows a square with perimeter 16 cm.



Work out the proportion of the area inside the square that is shaded.

(5 marks)

12 The diagram shows the floor of a village hall.



The caretaker needs to polish the floor.

One tin of polish normally costs £19
One tin of polish covers 12 m^2 of floor.

There is a discount of 30% off the cost of the polish.

The caretaker has £130

Has the caretaker got enough money to buy the polish for the floor?
You must show all your working.

(5 marks)

13 The diagram shows the floor plan of Mary's conservatory.

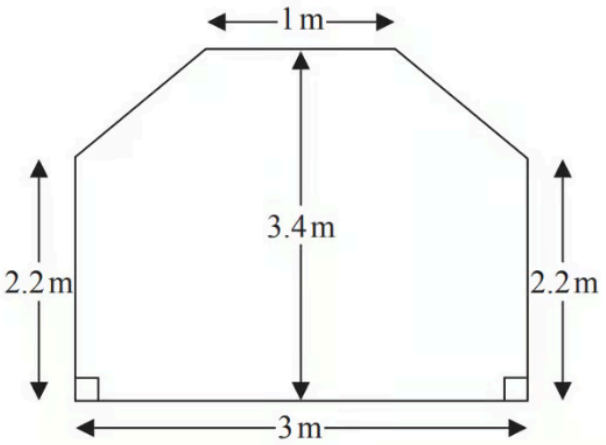


Diagram **NOT** accurately drawn

Mary is going to cover the floor with tiles.

The tiles are sold in packs.
One pack of tiles will cover $2m^2$
A pack of tiles normally costs £24.80
Mary gets a discount of 25% off the cost of the tiles.

Mary has £100

Does Mary have enough money to buy all the tiles she needs? You must show all your working.

(5 marks)

14 The diagram shows a rectangle $ABCD$ and a semicircle with diameter AB where

$AB = 12$ cm. The point E lies on DC and also on the semicircle.

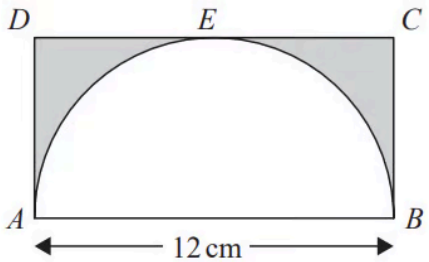


Diagram **NOT** accurately drawn

Work out the area of the shaded region.
Give your answer correct to 3 significant figures.

..... cm^2

(3 marks)

15 The diagram shows a shape.

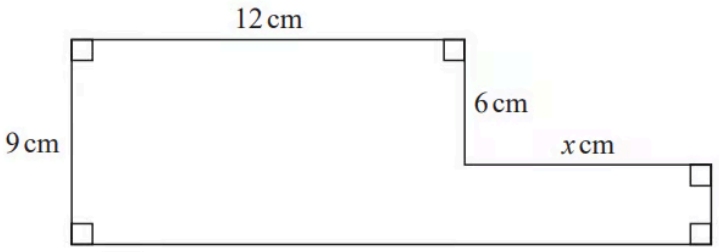
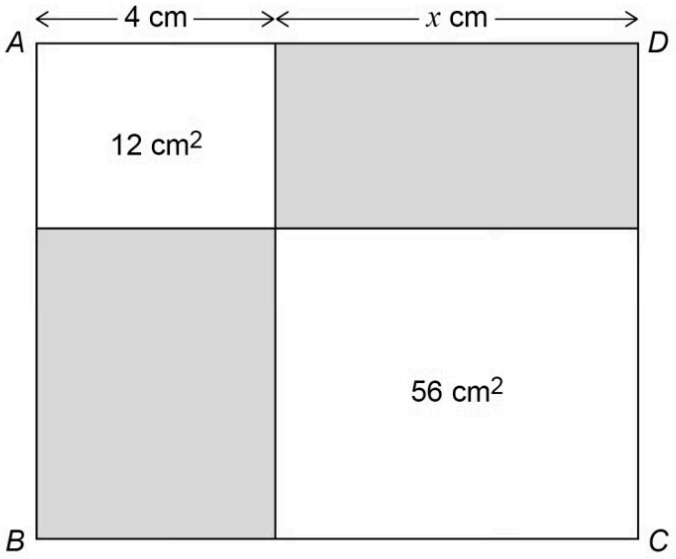


Diagram **NOT** accurately drawn

The shape has area 129 cm^2
Work out the value of x.

(4 marks)

16 Rectangle $ABCD$ is split into four smaller rectangles.
Two of the smaller rectangles are shaded.



Not drawn accurately

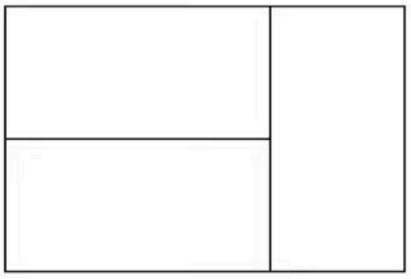
$4 : x = 1 : 2$

For rectangle $ABCD$, work out the ratio shaded area : unshaded area

Give your answer in its simplest form.

(4 marks)

17 A large rectangle is made by joining three identical small rectangles as shown.



Not drawn accurately

The perimeter of one small rectangle is 15 cm

Work out the perimeter of the large rectangle.

.....cm

(4 marks)

Very Hard Questions

1

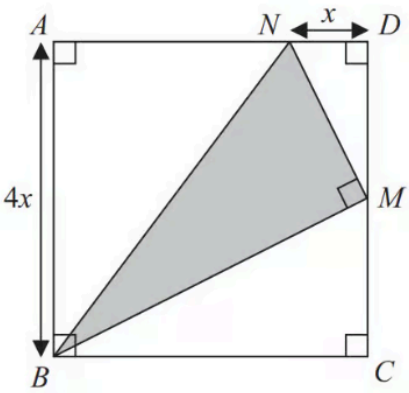


Diagram **NOT** accurately drawn

$ABCD$ is a square with a side length of $4x$
M is the midpoint of DC.
N is the point on AD where $ND = x$

BMN is a right-angled triangle.

Find an expression, in terms of x, for the area of triangle BMN. Give your expression in its simplest form.

(4 marks)

2 The line l is a tangent to the circle $x^2 + y^2 = 40$ at the point A.
A is the point (2, 6).

The line l crosses the x-axis at the point P.

Work out the area of triangle OAP.

(5 marks)

3

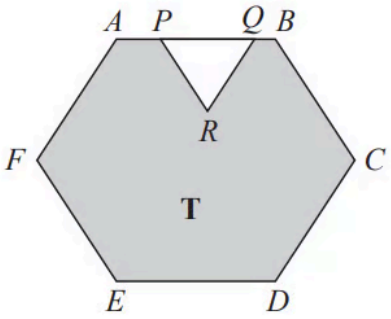


Diagram **NOT** accurately drawn

The diagram shows a shaded region **T** formed by removing an equilateral triangle PQR from a regular hexagon $ABCDEF$.

The points P and Q lie on AB such that $AB = 1.5 \times PQ$.

Given that the area of region **T** is $72\sqrt{3}$ cm^2 work out the length of PQ.

..... cm

(4 marks)

4 The diagram shows one face of a wall.

This face is in the shape of a pentagon with exactly one line of symmetry.

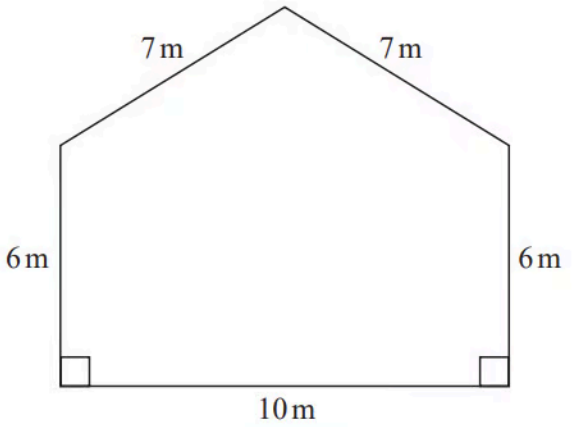


Diagram **NOT** accurately drawn

Omondi is going to paint this face of the wall once.
He has to buy all the paint that he needs to use.

The paint in each tin of paint Omondi is going to buy will cover 16 m^2 of the face of the wall.

Work out the least number of tins of paint Omondi will need to buy.
Show your working clearly.

(5 marks)

5 The diagram shows an isosceles triangle.

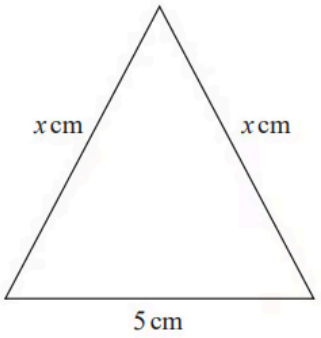


Diagram **NOT** accurately drawn

The area of the triangle is $12\ \text{cm}^2$

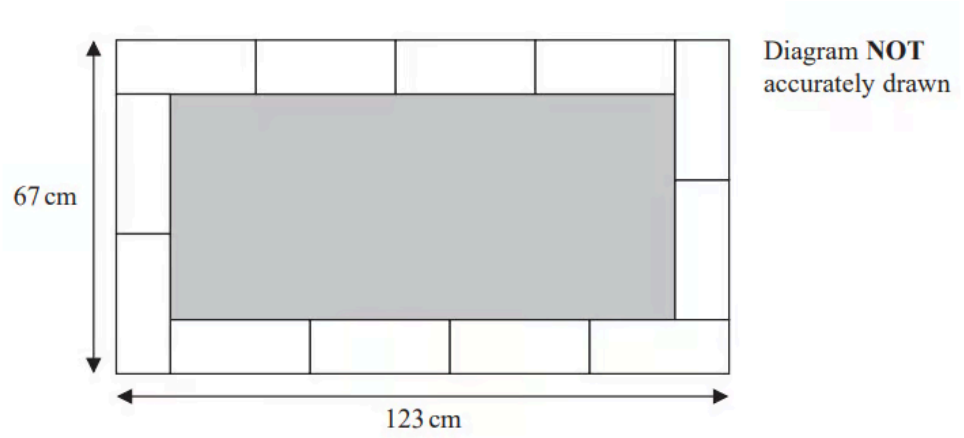
Work out the perimeter of the triangle.
Give your answer correct to 3 significant figures.

cm

(4 marks)

6 Calvin has 12 identical rectangular tiles.
He arranges the tiles to fit exactly round the edge of a shaded rectangle, as shown in the

diagram below.



Work out the area of the shaded rectangle.

(5 marks)

7 A, B and C are points on a circle with centre O.

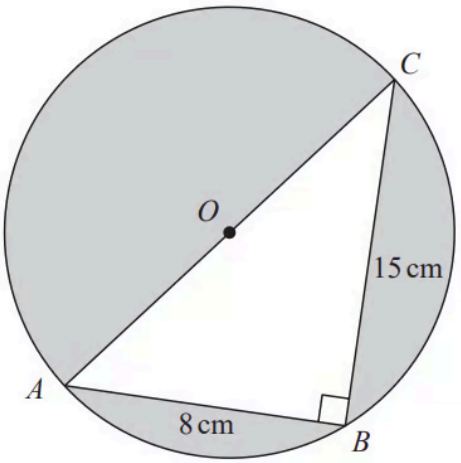


Diagram **NOT** accurately drawn

AOC is a diameter of the circle.
$AB = 8$ cm $BC = 15$ cm

Angle $ABC = 90°$

Work out the total area of the regions shown shaded in the diagram.
Give your answer correct to 3 significant figures.

(5 marks)

8 The diagram shows a regular octagon $ABCDEFGH$.

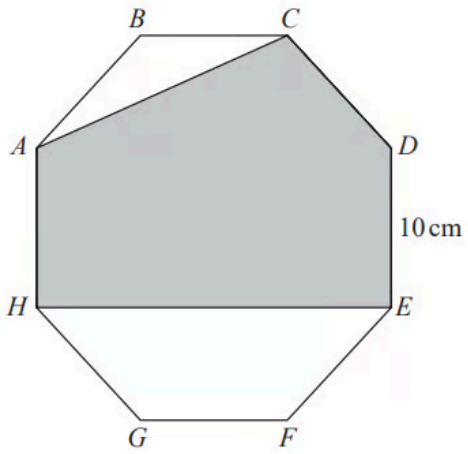


Diagram **NOT** accurately drawn

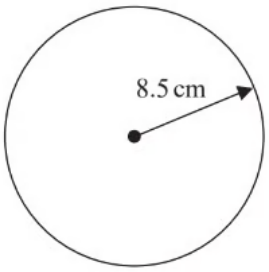
Each side of the octagon has length 10cm.

Find the area of the shaded region $ACDEH$.
Give your answer correct to the nearest cm^2

..... cm^2

(6 marks)

9 The diagram shows a circle and a trapezium.



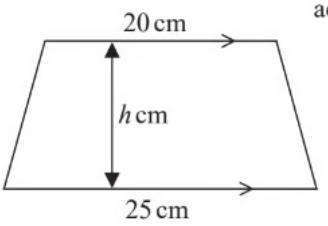


Diagram **NOT** accurately drawn

The height of the trapezium is h cm.

The area of the circle is equal to the area of the trapezium

Work out the value of h.
Give your answer correct to 1 decimal place.

(4 marks)

10 The diagram shows a shaded shape $ABCD$ made from a semicircle ABC and a right-

angled triangle ACD.

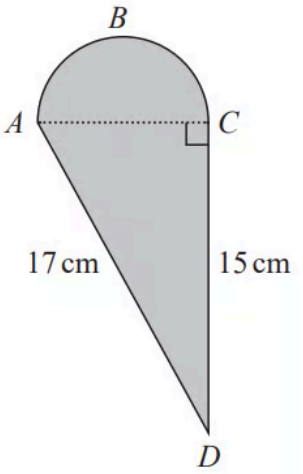


Diagram **NOT** accurately drawn

AC is the diameter of the semicircle ABC.
Work out the perimeter of the shaded shape.
Give your answer correct to 3 significant figures.

.....cm

(5 marks)

11 The diagram shows two circles such that the region **R**, shown shaded in the diagram, is

the region common to both circles.

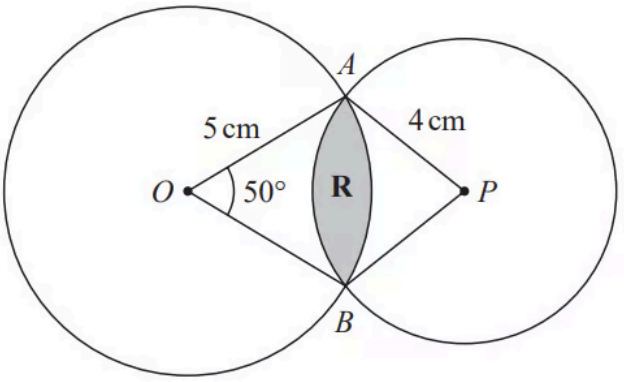


Diagram **NOT** accurately drawn

One of the circles has centre O and radius 5cm.
The other circle has centre P and radius 4 cm.
Angle $AOB = 50°$

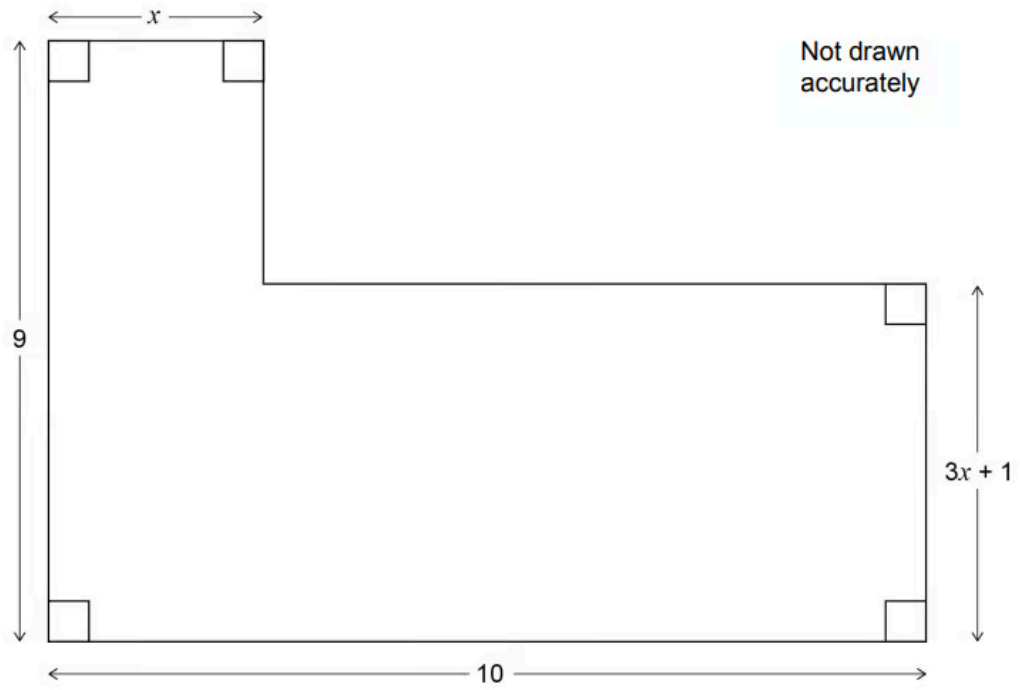
Calculate the area of region **R**.
Give your answer correct to 3 significant figures.

..... cm^2

(6 marks)

12 Here is an L-shape.

All dimensions are in centimetres.

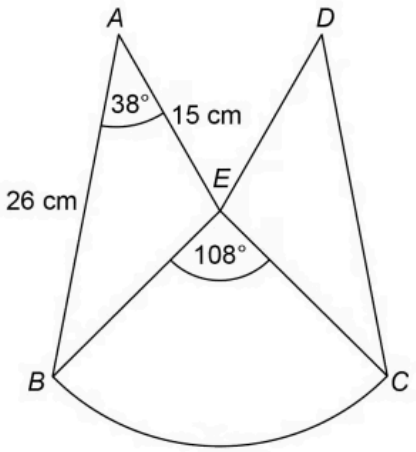


The area of the L-shape is 65 cm^2
Work out the value of x.

(6 marks)

13 The diagram shows a logo.

ABE and DCE are congruent triangles.
BCE is a sector of a circle, centre E.

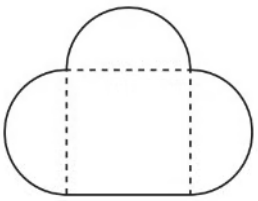


Not drawn accurately

Show that the area of the logo is 510 cm^2 to 2 significant figures.

(5 marks)

14 The diagram shows Jane's lawn.
It is in the shape of a square of side 36m and three semi-circles.



Not to scale

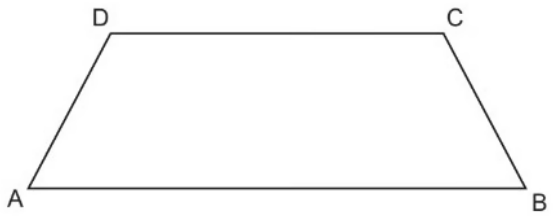
She is going to spread fertiliser on the lawn at a rate of 30g per square metre.
The fertiliser is only sold in 10kg bags costing £15.80 each.

Calculate the cost of buying the bags of fertiliser for her lawn. You must show all your working.

£ .....

(6 marks)

15 ABCD is a trapezium.



Not to scale

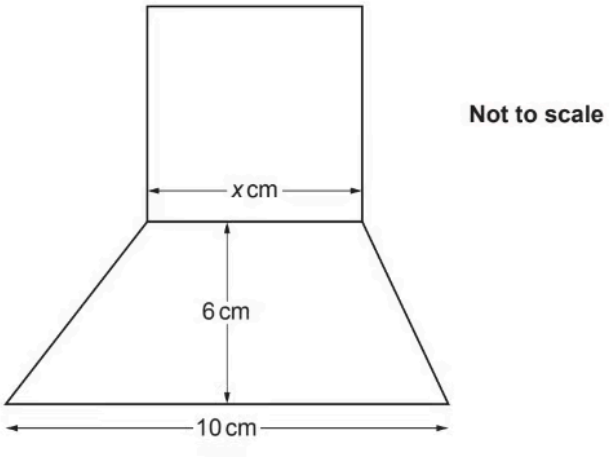
The perimeter of the trapezium is 56 cm.
The ratio AD : AB : DC : BC = 5 : 12 : 6 : 5.

Calculate the area of the trapezium.
Show your working.

.....cm^2

(7 marks)

16 In the diagram, the square and the trapezium share a common side of length x cm.



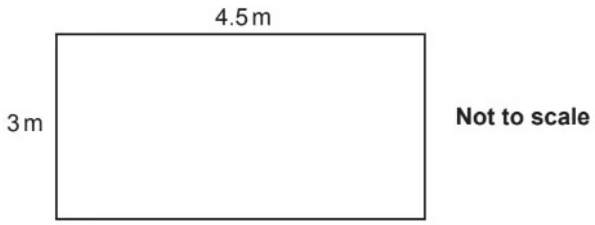
The area of the square is equal to the area of the trapezium.

Work out the value of x.

x = ...

(6 marks)

17 Here is the floor plan of a rectangular room.



Tim buys carpet tiles for this room.

Each tile is a square measuring 50cm by 50cm.
The tiles are only sold in packs of ten.
Each pack costs £20.
Tim pays for fitting at a rate of £7.50 per square metre, with any fraction of a square metre rounded up.

Work out the **total** cost of the tiles and fitting.

£ .....

(6 marks)

18 The lengths of the sides of two squares are integers, when measured in cm.
The difference between the areas of the two squares is 36cm^2.

Find the lengths of the sides of the two squares.

..... cm
..... cm

(3 marks)