

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

GCSE APPLICATIONS OF MATHEMATICS (LINKED PAIR)

F

Foundation Tier Unit 2 Geometry and Measures

Friday 13 November 2015

Morning

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a calculator
- mathematical instruments.



Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- If your calculator does not have a π button, take the value of π to be 3.14 unless another value is given in the question.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80
- The quality of your written communication is specifically assessed in Questions 5, 14 and 15. These questions are indicated with an asterisk (*).
- You may ask for more answer paper, tracing paper and graph paper. These must be tagged securely to this answer book.
- You are expected to use a calculator where appropriate.

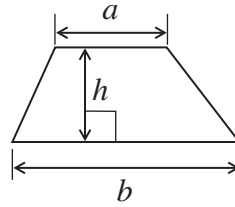
Advice

- In all calculations, show clearly how you work out your answer.

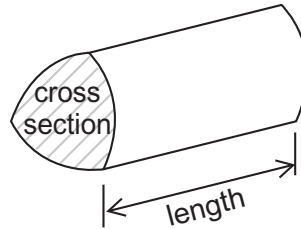


Formulae Sheet: Foundation Tier

Area of trapezium = $\frac{1}{2}(a+b)h$



Volume of prism = area of cross section \times length



Answer **all** questions in the spaces provided.

1 A sorting game has these cards.
The cards describe parts of a circle.

diameter	centre	sector
arc	segment	chord

Put the cards in the correct column.
You will **not** be able to use all the cards.

[3 marks]

Parts that are straight lines	Parts that have an area

3

Turn over ►



2 Brad has a bicycle.

2 (a) The weight of his bicycle is 12.7 kilograms.

Work out the weight in grams.

[1 mark]

.....

Answer g

2 (b) His bicycle seat is 80 centimetres above the ground.
Brad raises the seat by 15 millimetres.

Work out how far above the ground the seat is now.
Give your answer in centimetres.

[2 marks]

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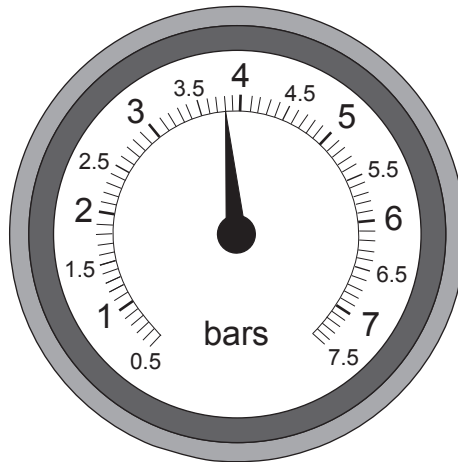
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Answer cm



A bar is a unit of pressure.
The scale shows the pressure in Brad's front tyre.



2 (c) What is the pressure in his front tyre?

[1 mark]

Answer bars

2 (d) The pressure in his front tyre needs to be 4.5 bars.

By how many bars does he need to change the pressure?

[1 mark]

.....

.....

.....

Answer bars



3 You can buy snacks and drinks from a vending machine.

	A	B	C	D	E
1	Apple (small)	Crisps	Chocolate bar	Apple (large)	Orange Juice
2	Banana	Cereal bar	Energy drink (30 cl)	Biscuits	Mango Juice
3	Crisps	Crisps	Water (50 cl)	Chocolate bar	Orange Juice
4	Cereal bar	Water (250 ml)	Chocolate bar	Chocolate bar	Energy drink (50 cl)

Prices

Columns A and B	Each item	60p
Columns C and D	Each item	80p
Column E	Each item	£1.20

To buy a banana you pay 60p and enter the code A2



3 (a) Olly buys the **larger** bottle of water from the machine.

What code does he enter?

[2 marks]

Answer

3 (b) Heidi has seven 20p coins.
She does not have any other coins.

She wants to

- buy one drink and one piece of fruit
- use all the coins.

Work out **all** the possible pairs of codes she could enter.
One pair has been done for you.

[3 marks]

A1 and C2

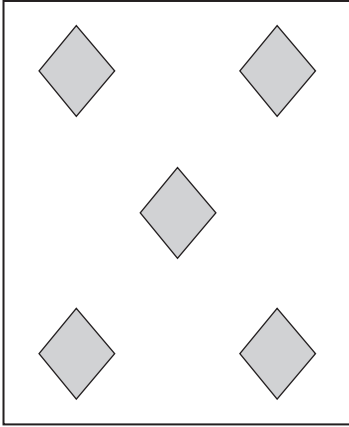


4 Here are some rectangular cards used in a game.

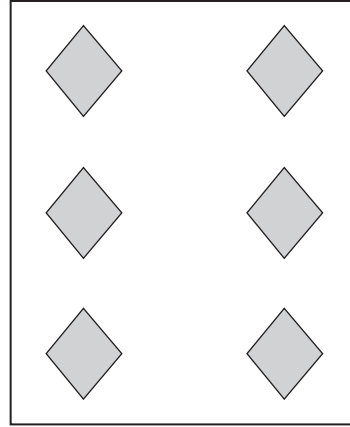
The shapes on the cards are rhombuses.

All of the rhombuses are identical.

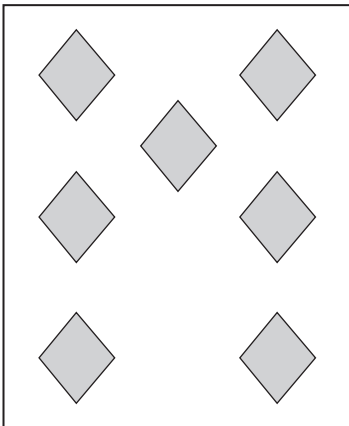
Card A



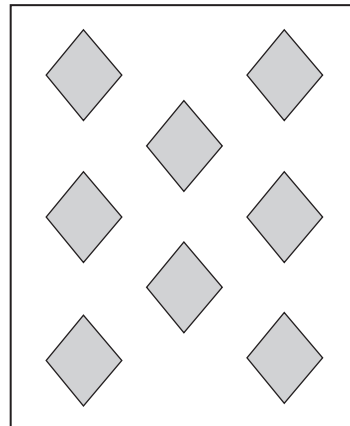
Card B



Card C



Card D



4 (a) Circle the word which describes identical shapes.

[1 mark]

regular

congruent

similar

even



4 (b) Circle the card which has **exactly** one line of symmetry.

[1 mark]

Card A

Card B

Card C

Card D

4 (c) Circle the order of rotational symmetry of Card D.

[1 mark]

0

1

2

4

4 (d) The cards for the game are kept in a box.
There is a drawing of a rhombus on the lid of the box.

The rhombus has

- side length 5 cm
- a diagonal of 9 cm

Using ruler and compasses, construct an accurate drawing of the rhombus.

[3 marks]



5 A restaurant has two meal deals.

Meal Deal A	
Starter and main or Main and dessert	£20

Meal Deal B	
Starter, main and dessert	£24

*5 (a) A group of people buy 8 of Meal Deal A and 4 of Meal Deal B.

Show that the total cost is £256

[2 marks]

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5 (b) A different group of people buy meal deals for a total cost of £348

How many of each meal deal do they buy?
Give **one** possible answer.

[2 marks]

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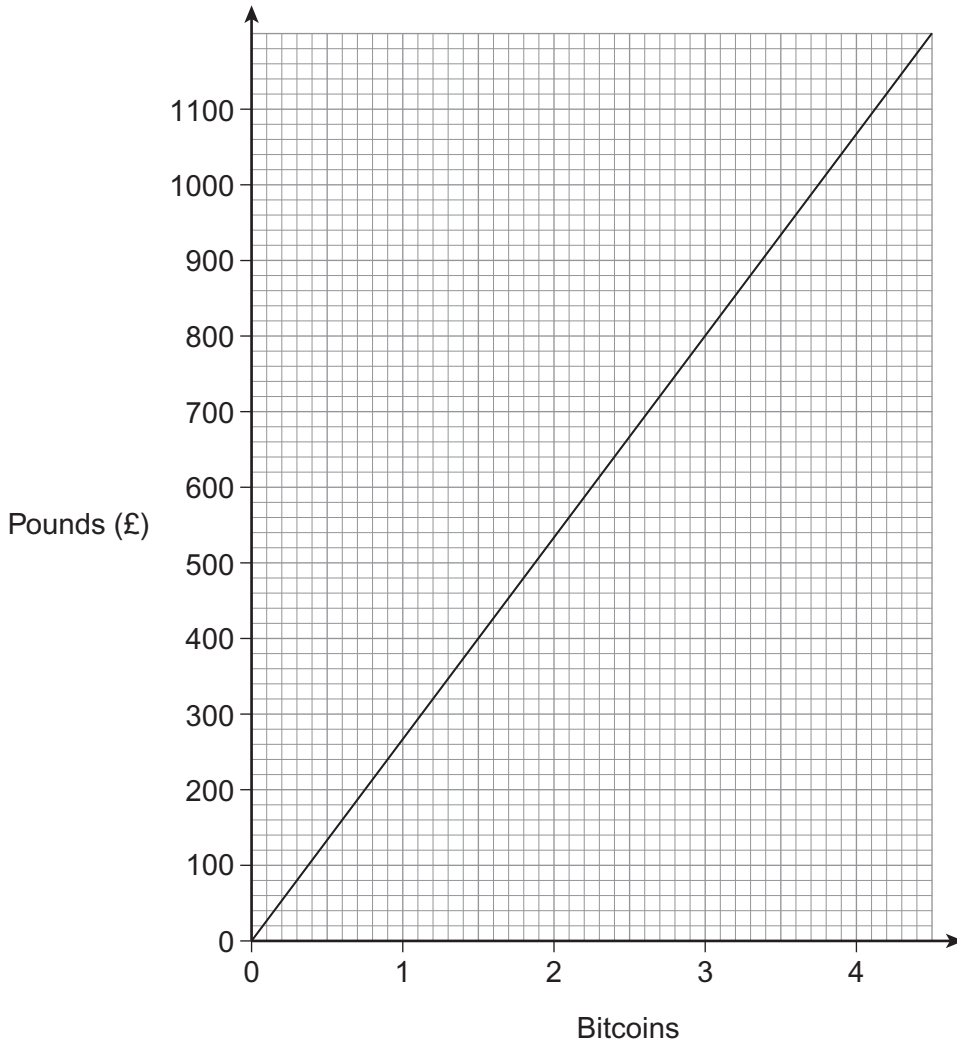
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..... Meal Deal A

..... Meal Deal B



6 Here is a conversion graph for bitcoins and pounds (£).



6 (a) Work out the value, in pounds, of 2.5 bitcoins.

[1 mark]

Answer £

6 (b) Work out the value, in bitcoins, of £4000

[2 marks]

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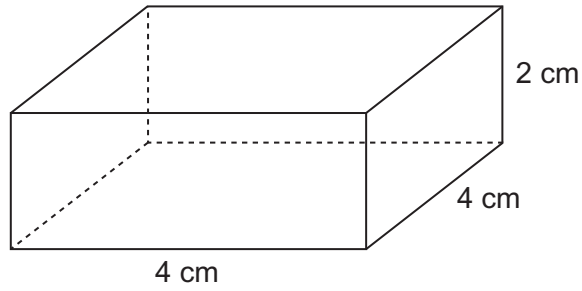
Answer bitcoins

7

Turn over ►

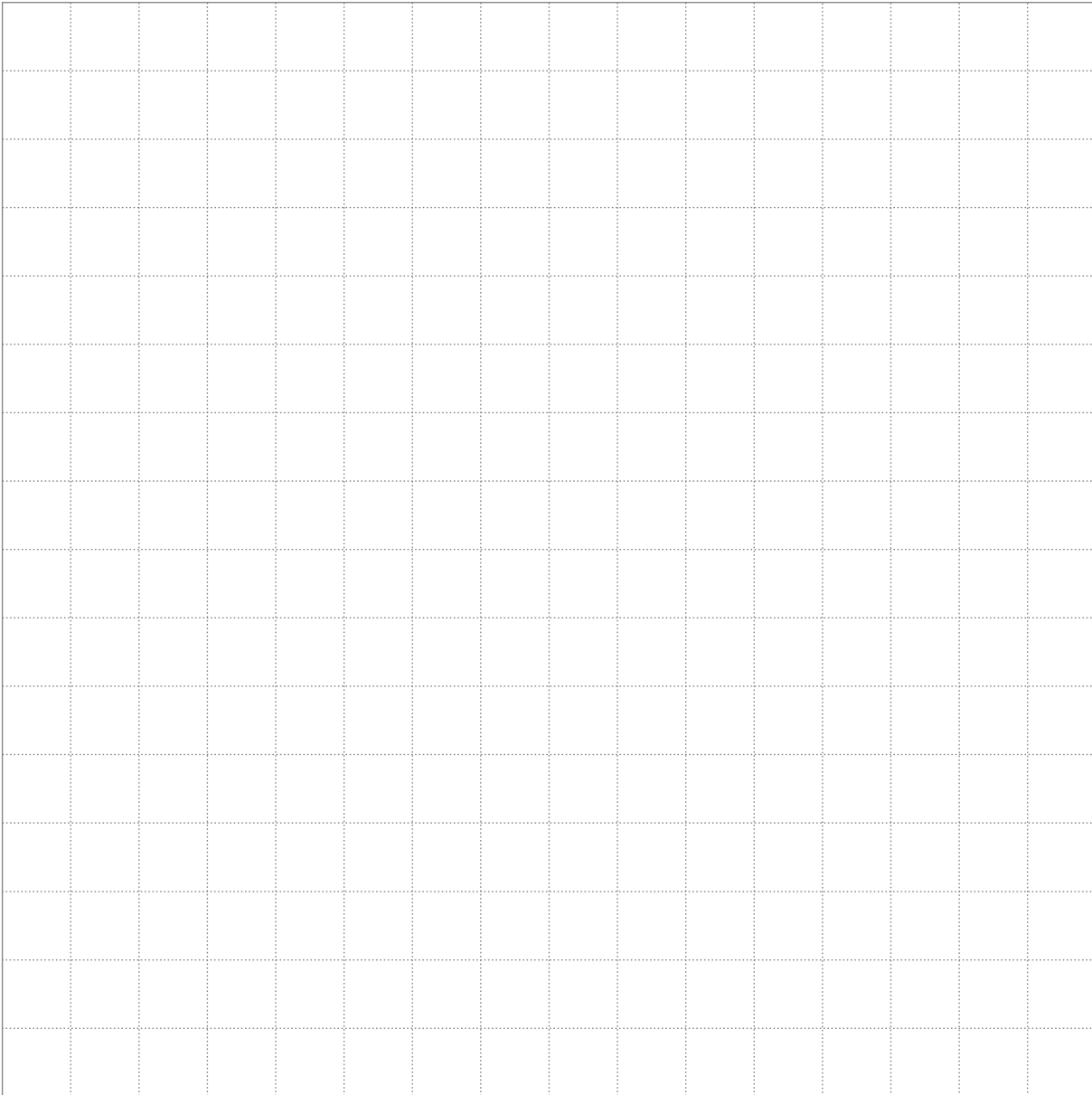


- 7 A box is a cuboid measuring 4 cm by 4 cm by 2 cm
The box has a lid.

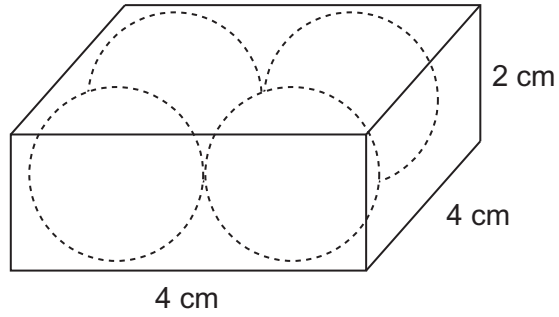


- 7 (a) Draw the net of the cuboid on this centimetre grid.

[3 marks]



7 (b) Four identical balls **just** fit in the box.



A larger box is also a cuboid.
12 of the balls will **just** fit in this box.

Work out possible dimensions for this box.

[2 marks]

Length

cm

Width

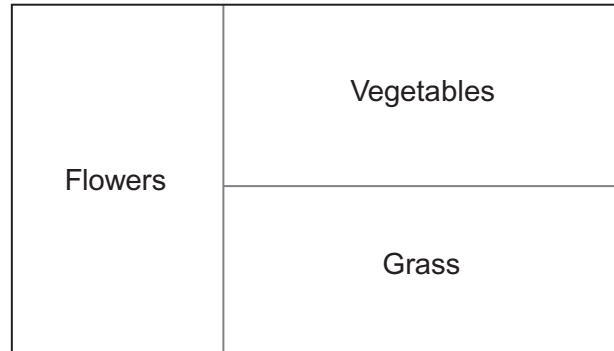
cm

Height

cm



- 8 This diagram shows how a rectangular garden is organised into three rectangular sections.



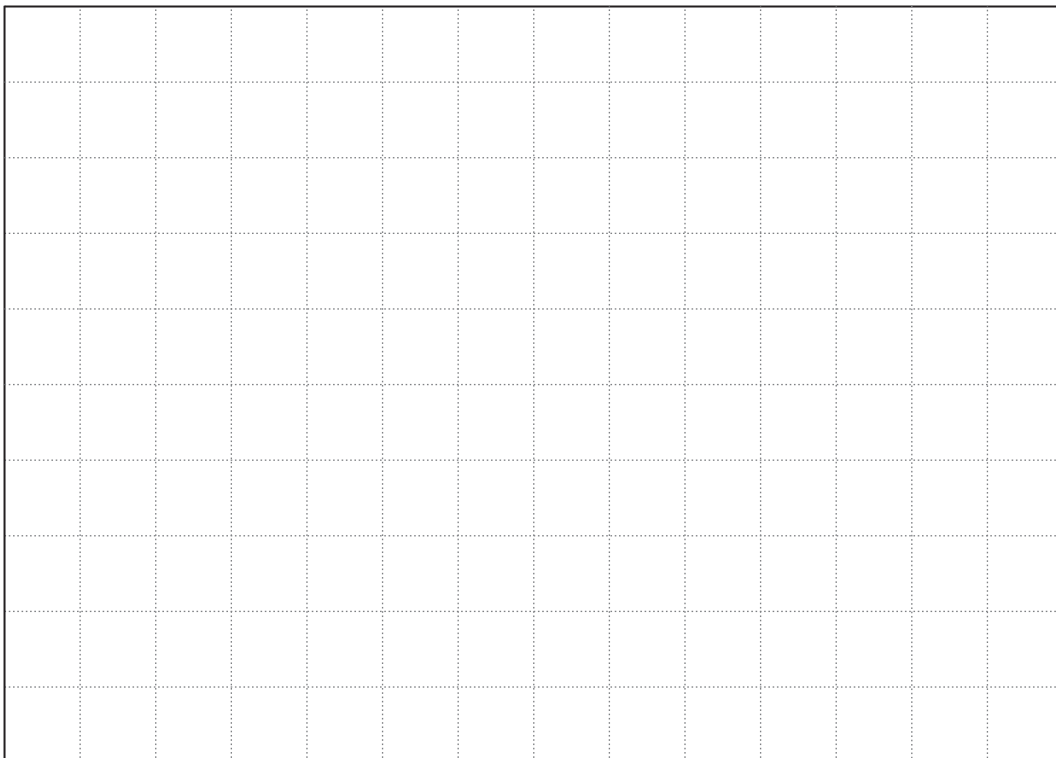
Not drawn
accurately

- The flowers section is a 4 metre by 10 metre rectangle.
- The grass section has the **same area** as the **flowers** section.

- 8 (a) Show the positions of the three sections on this scale drawing of the garden.

[3 marks]

Scale 1 centimetre represents 1 metre



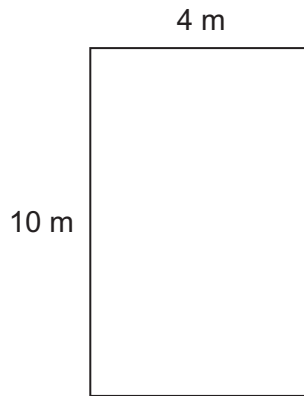
8 (b) Work out the actual area of the vegetables section.
State the units of your answer.

[2 marks]

.....

Answer

8 (c) Edging is put all the way around the flowers section.



Not drawn
accurately

Edging in strips of length 1.8 metres is used.
The strips can be cut to make smaller lengths.

Work out the number of strips needed.

[3 marks]

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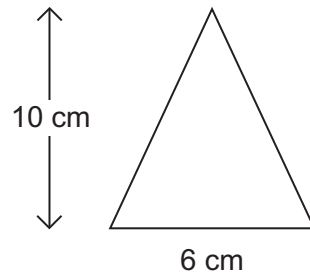
Answer strips

8

Turn over ►

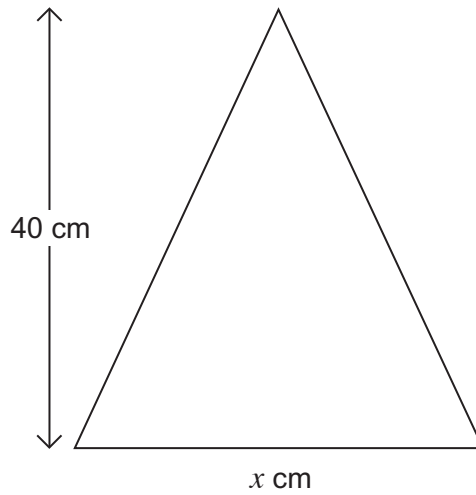


- 9 The diagram shows part of a school badge in the shape of an isosceles triangle. The base is 6 cm and the perpendicular height is 10 cm



Not drawn
accurately

Here is an enlargement of the triangle. The perpendicular height is 40 cm



Not drawn
accurately

- 9 (a) Show that $x = 24$

[1 mark]

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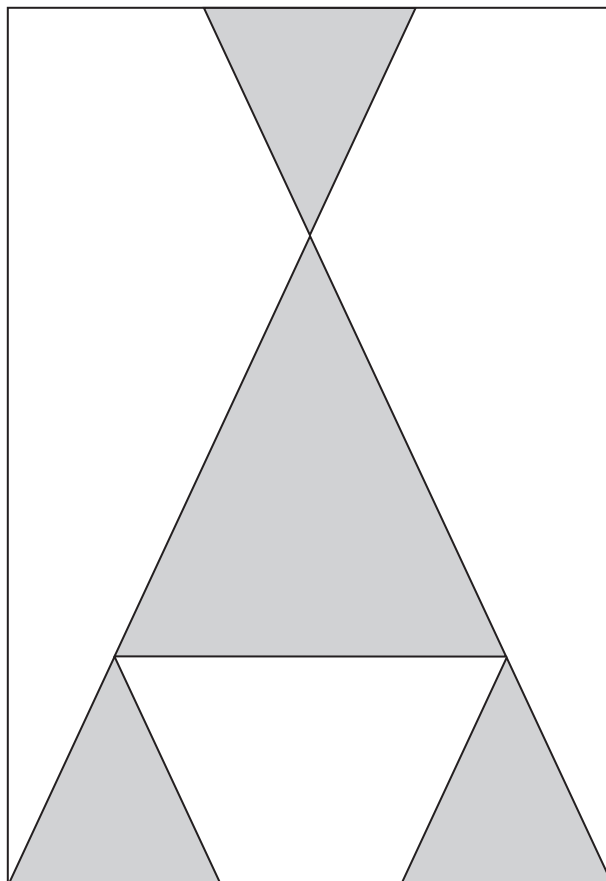
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9 (b) For an open day, a rectangular poster is made with
three of the smaller triangles
one of the larger triangles.

The poster has one line of symmetry.



Not drawn
accurately

Work out the area of the poster.

[3 marks]

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Answer cm²

4

Turn over ►

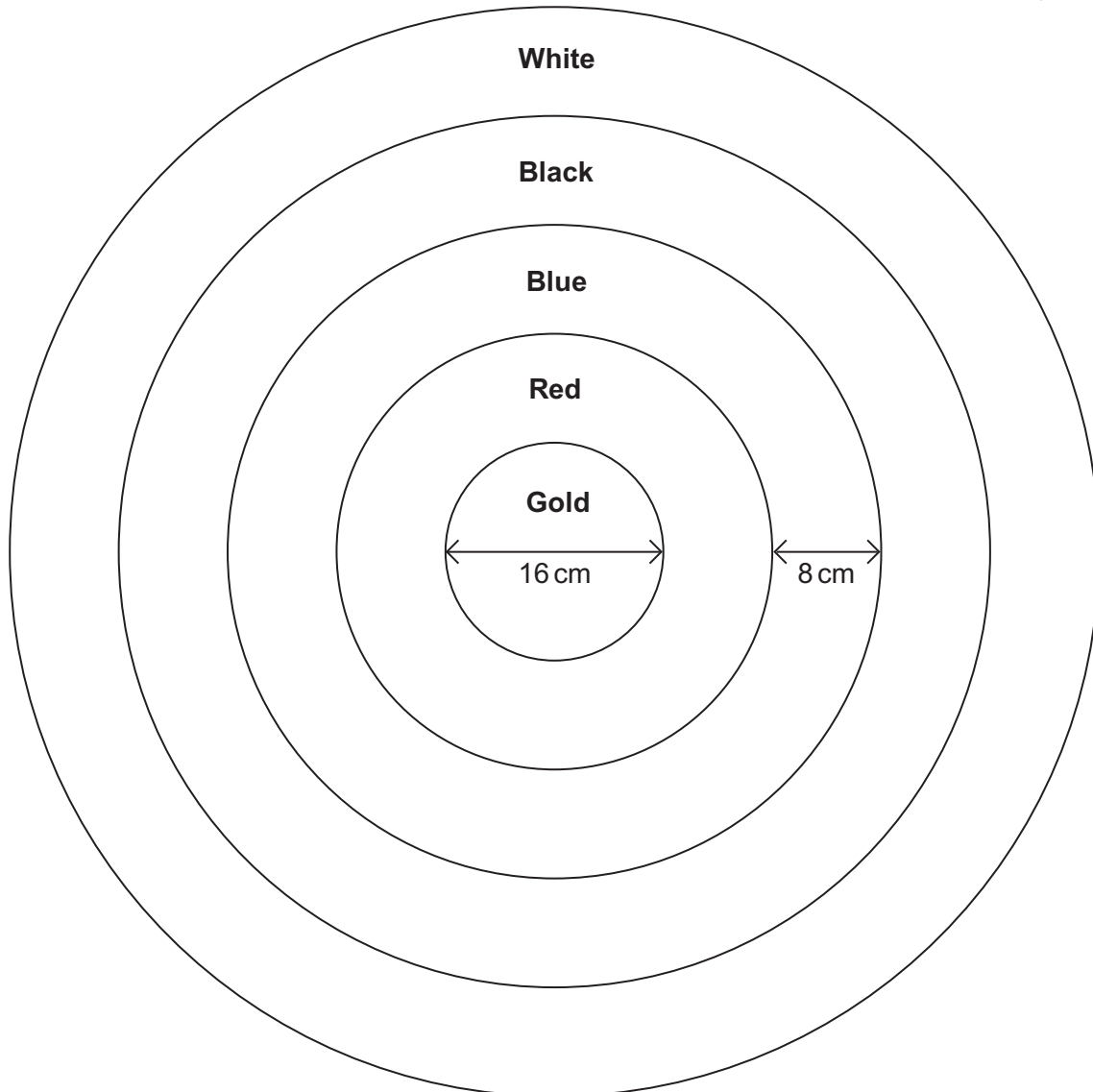


- 10** An archery target is made by drawing 5 circles.
All the circles have the same centre.

The diameter of the gold circle is 16 cm

The width of each of the other sections is 8 cm

Not drawn
accurately



10 (a) Circle the **radius** of the largest circle.

[1 mark]

40 cm

44 cm

48 cm

80 cm

10 (b) Work out the **circumference** of the largest circle.
Give your answer as a decimal.

[2 marks]

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Answer cm

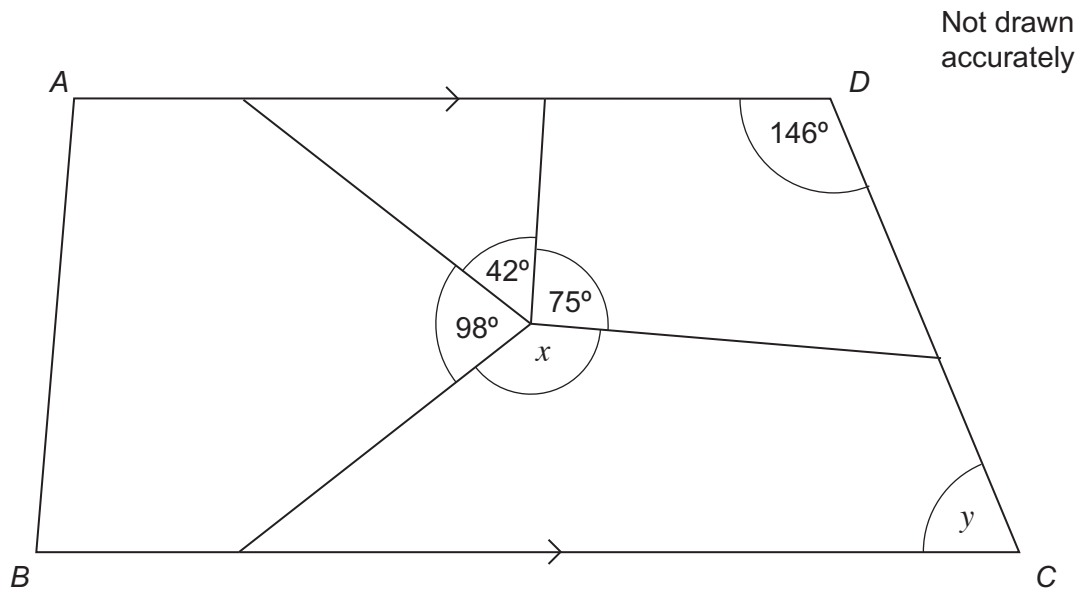
Turn over for the next question

3

Turn over ►



- 11 (a)** The pieces of a puzzle fit together to make quadrilateral $ABCD$.
 AD is parallel to BC .



Work out the size of angle x and the size of angle y .

[3 marks]

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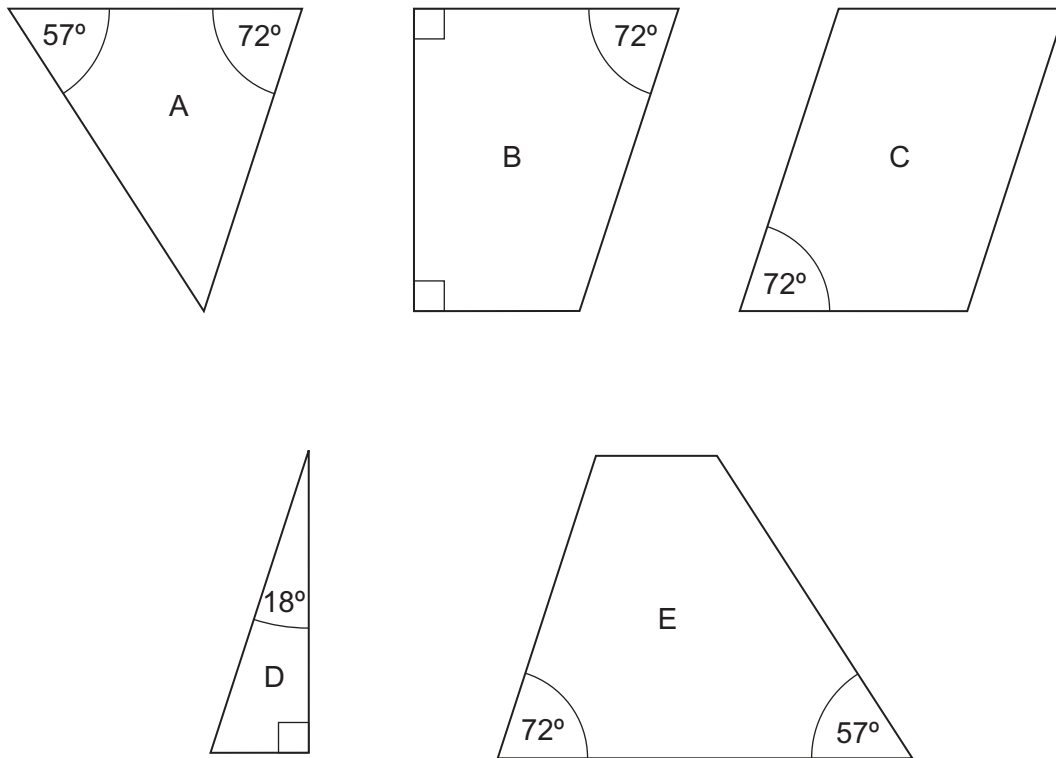
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$x =$ degrees

$y =$ degrees



11 (b) A, B, C, D and E are five pieces of a different puzzle.



The five pieces fit together to make a rectangle.
Piece B is in the correct place.



Work out **one** possible order for the pieces to fit together.

[2 marks]

Order of pieces B

5

Turn over ►



12 A company has two printing machines.

Machine A prints 5400 leaflets per hour.

Machine B prints 6000 leaflets per hour.

12 (a) On Monday,

Machine A is used for 3 hours

Machine B is used for $1\frac{1}{2}$ hours.

Work out the **total** number of leaflets printed.

[2 marks]

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Answer

12 (b) On Tuesday,

Machine A is used for the same amount of time as Machine B

8550 leaflets are printed.

Work out the amount of time each machine is used for on Tuesday.
Give your answer in minutes.

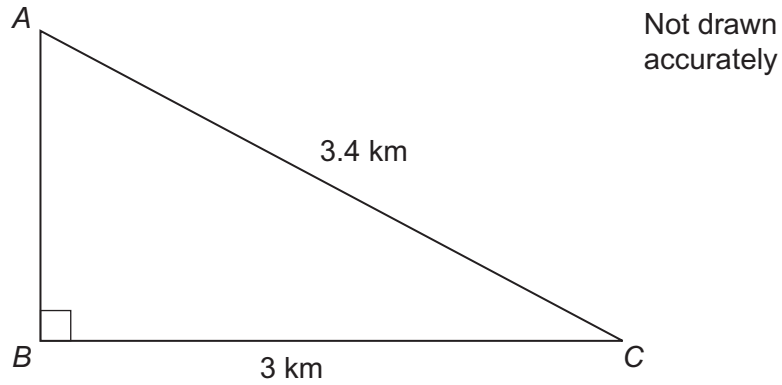
[3 marks]

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Answer minutes



13 The diagram shows three straight roads between villages A, B and C.



13 (a) Work out the distance AB.

[3 marks]

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Answer km

13 (b) Samir walks along the roads.
His route is

$$A \rightarrow B \rightarrow C \rightarrow A$$

His average speed is 3.2 kilometres per hour.

Work out the time for his walk.
Give your answer in hours and minutes.

[2 marks]

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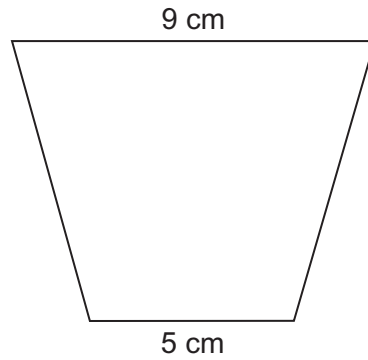
Answer hours minutes

10

Turn over ►

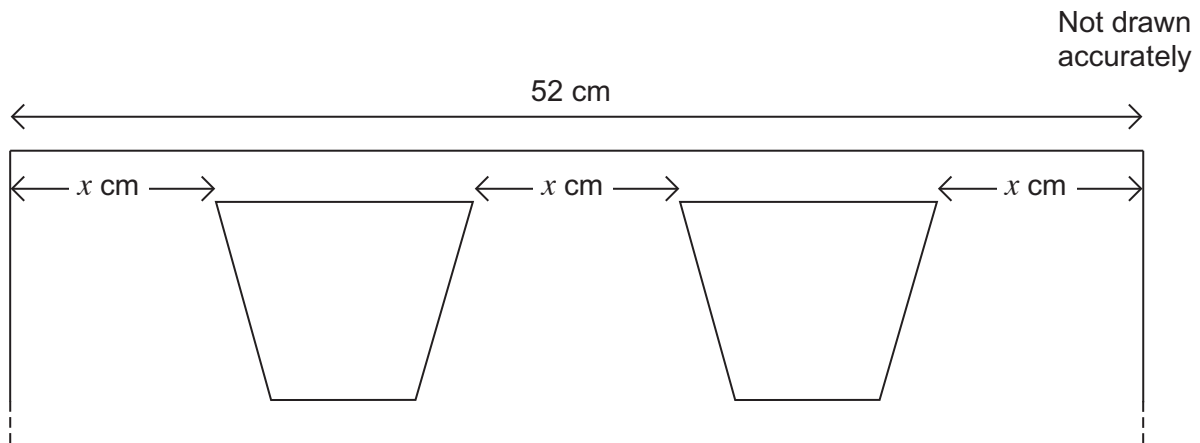


14 A designer uses this trapezium to make patterns.



Not drawn accurately

*14 (a) The diagram shows part of a rectangular sheet of wallpaper. The top edges of the two trapeziums are parallel to the top of the wallpaper. The two trapeziums are equally spaced across the wallpaper.



Not drawn accurately

Set up and solve an equation to find the value of x .

[4 marks]

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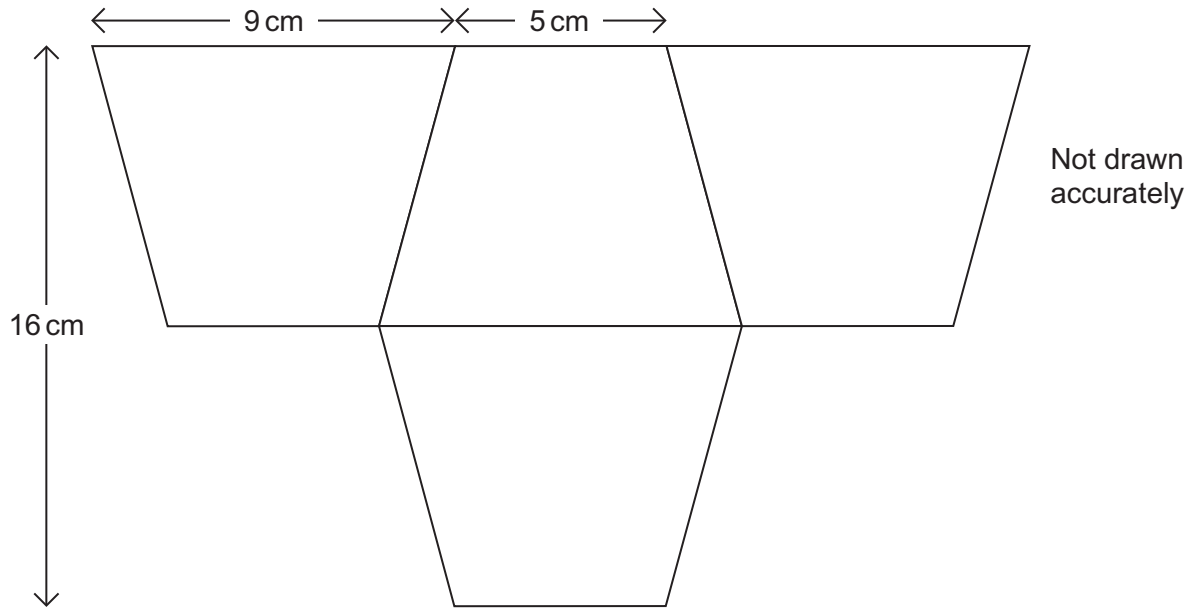
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$x =$



14 (b) Four of the trapeziums are put together to make a different pattern.
The trapeziums do **not** overlap.



Work out the area of this pattern.

[3 marks]

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Answer cm²

7

Turn over ►



***15** Here is some information about the parts made by two machines.

Machine P
2% of the parts were faulty

Machine Q
Made 5000 parts
75 parts were faulty

Compare the proportions of faulty parts made by Machine P and Machine Q.
You **must** show your working.

[3 marks]

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16 Amy has some red beads and some blue beads.
She uses the beads to make two necklaces, A and B.

<p style="text-align: center;">Necklace A 24 beads 3 times as many red beads as blue beads</p>
<p style="text-align: center;">Necklace B 35 beads number of red beads : number of blue beads = 3 : 2</p>

How many **more** red beads than blue beads does she use?

[4 marks]

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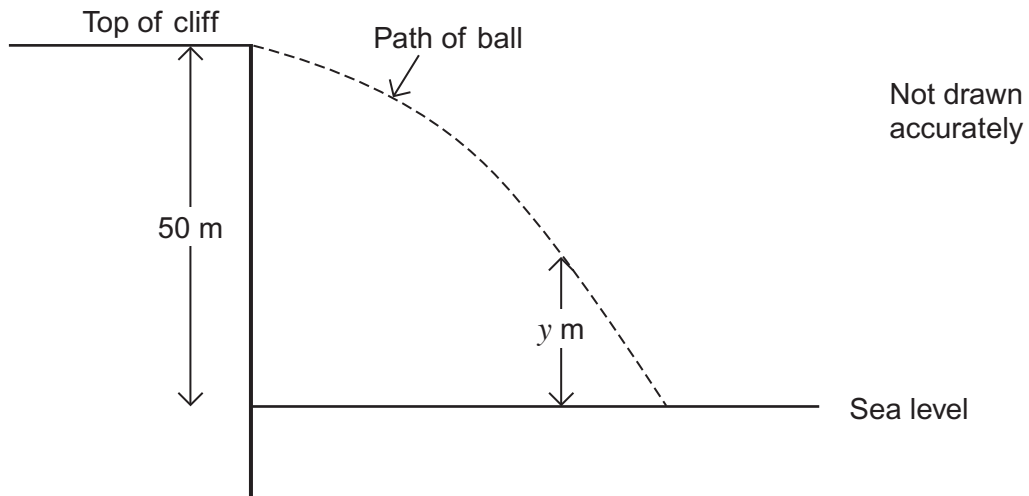
Answer

7

Turn over ►



- 17 A ball is kicked horizontally from the top of a cliff. The top of the cliff is 50 metres above sea level.



The height of the ball is modelled by the equation

$$y = 50 - 4.9t^2$$

y is the height of the ball, in metres, above sea level.

t is the time, in seconds, after the ball is kicked.

- 17 (a) Complete this table of values for $y = 50 - 4.9t^2$.
Values of y are given to 1 decimal place.

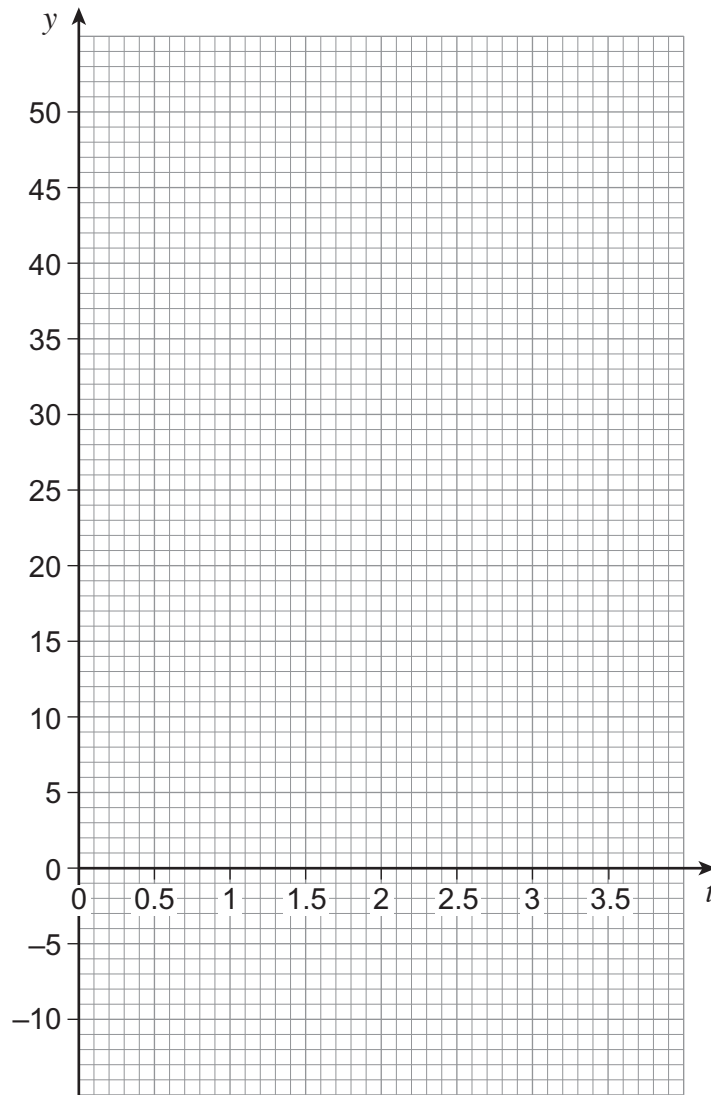
[2 marks]

t	0	0.5	1	1.5	2	2.5	3	3.5
y	50.0	48.8		39.0		19.4	5.9	-10.0



17 (b) Draw the graph of $y = 50 - 4.9t^2$ for values of t from 0 to 3.5

[2 marks]



17 (c) Use your graph to estimate the time the ball takes to reach sea level.

[1 mark]

Answer seconds

END OF QUESTIONS

5



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