NOTICE TO CUSTOMER:

The sale of this product is intended for use of the original purchaser only and for use only on a single computer system. Duplicating, selling, or otherwise distributing this product is a violation of the law ; your license of the product will be terminated at any moment if you are selling or distributing the products.

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

1 Given that $d = 6$ and $f = -12$

work out the value of $\dfrac{9(d - 10)}{f}$

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Answer ..... *(3 marks)*

2 Use approximations to estimate the value of $\dfrac{795.4}{2.1^2 \times 9.8}$

You **must** show your working.

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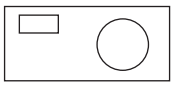
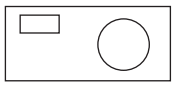
Answer ..... *(3 marks)*

***3** Simon sees the same model of digital camera for sale in two different shops.

Clix	**Snapz**
	
Normal price £210	Normal price £195
Sale price 40% off	Sale price $\frac{1}{3}$ off

Which shop has the cheaper sale price?
You **must** show your working.

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(5 marks)

Turn over for the next question

11

4 A bag contains only red, blue and yellow counters.
There are three times as many blue counters as yellow counters.
There are 43 counters in the bag.

Some red counters are added to the bag.
There are now 50 counters in the bag.
The number of red counters has doubled.

How many yellow counters are in the bag?

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Answer ..... *(3 marks)*

11

5 (a) Solve $7x = 15 - 3x$

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Answer x = ... *(2 marks)*

5 (b) $2(x + 16) + 4(x - 5)$ simplifies to $a(x + b)$

Work out the values of a and b.

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Answer a = ... , b = ... *(3 marks)*

6 Amy, Ben, Colleen and Dave share some money.

Amy has $\frac{1}{6}$ of the money.

Ben has $\frac{1}{5}$ of the money.

The difference between Amy's share and Ben's share is added to Colleen's share.
The answer is equal to half the money.

Show that Amy and Dave each have the same amount of money.

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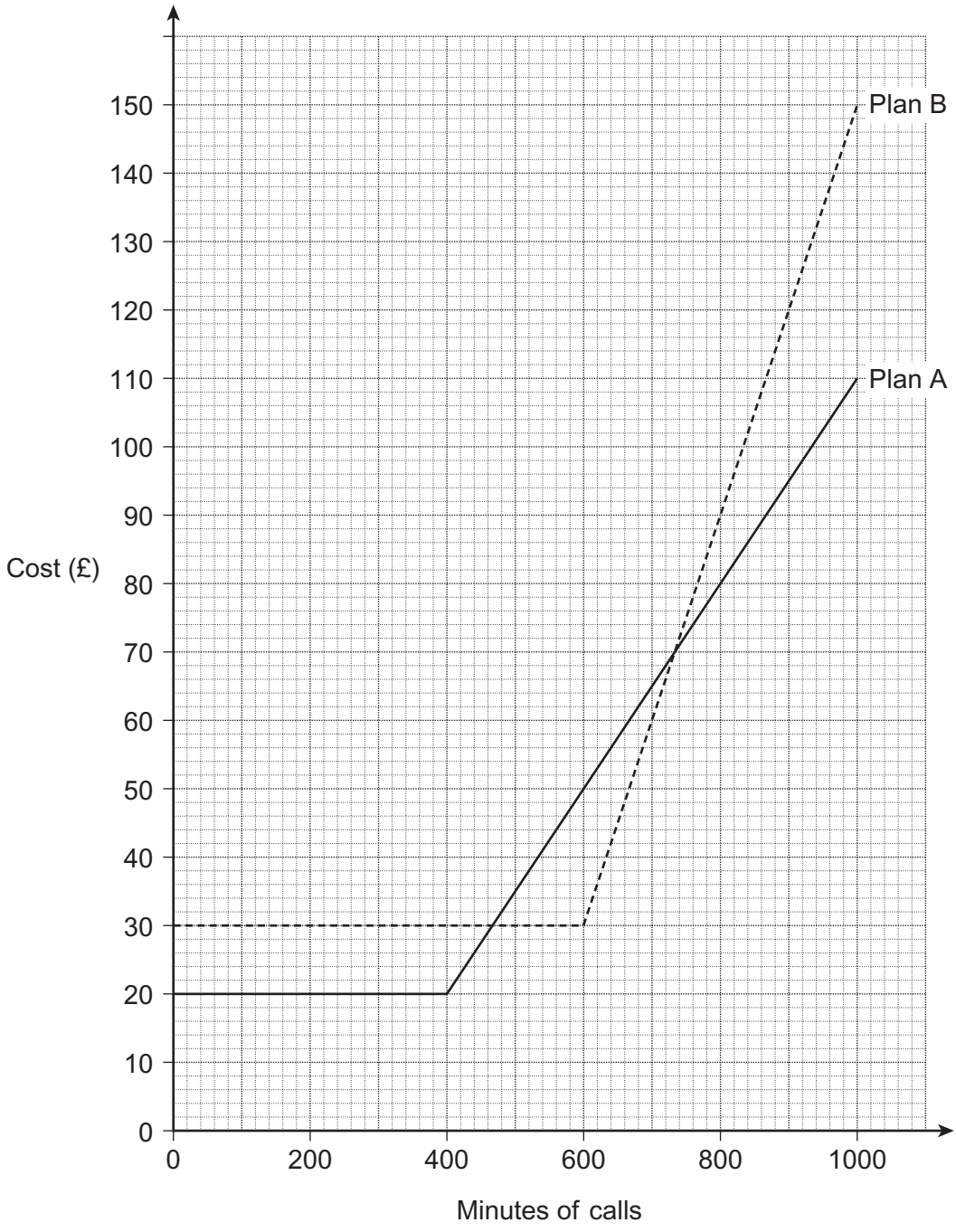
(5 marks)

13

7 Plan A and Plan B are two monthly mobile phone plans.
Here are the details of Plan A.

Monthly charge	£20
400 minutes of calls	Free
Each extra minute	15p

The graph shows the costs for both plans.



7 (a) Ben usually makes about 800 minutes of calls a month.

Which plan should he choose?
Give a reason for his choice.

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(2 marks)

7 (b) Sarah chooses Plan B.

How much does she pay for each extra minute of calls?

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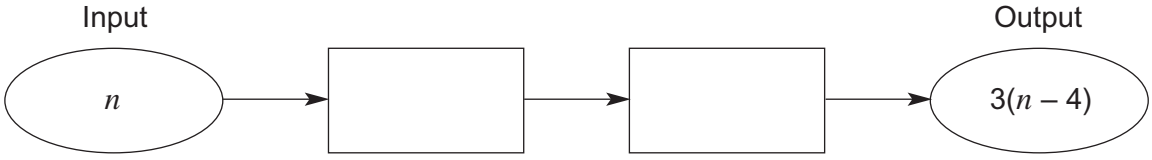
Answer ..... *(3 marks)*

8 Here is a number machine.



8 (a) Write an operation in each box to make the number machine work.

(2 marks)

8 (b) Work out the value of n when the input and output are equal.

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Answer n = ... *(2 marks)*

9

***9** The first three terms of a sequence are

a b c ……..

The term-to-term rule of the sequence is

Multiply by 2 and subtract 4

Show that $c = 4(a - 3)$

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(4 marks)

10 (a) Simplify $2x^3y^2 \times 4xy^5$

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Answer ..... *(2 marks)*

10 (b) Factorise fully $20y^2 - 8xy$

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Answer ..... *(2 marks)*

10 (c) Make x the subject of $w = y + \frac{x}{r}$

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Answer ..... *(2 marks)*

10 (d) Work out the least common multiple (LCM) of $6xy^2$ and $3x^2y$

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Answer ..... *(2 marks)*

12

11 There are some boys and girls at a bus stop.

11 girls get on the first bus to arrive.
The number of boys and girls at the bus stop is now the same.
16 boys get on the second bus to arrive.
The ratio of the number of boys to the number of girls at the bus stop is now 1 : 3

How many girls were at the bus stop to start with?

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Answer ..... *(4 marks)*

12 Two numbers, a and b, are combined using the operation $\bigtriangledown$ in the following way.

$$a \bigtriangledown b = 2a^2 - 7a - b + b^2$$

Work out **all** solutions of the equation $x \bigtriangledown 3 = 0$

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Answer ..... *(4 marks)*

13 Show that $7 + \frac{10}{x+2} = \frac{9}{x}$

simplifies to $7x^2 + 15x - 18 = 0$

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(3 marks)

14 Expand and simplify fully $(\sqrt{10} + \sqrt{2})(\sqrt{15} - \sqrt{3})$

Give your answer in the form $a\sqrt{b}$, where a and b are integers.

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Answer ..... *(4 marks)*

Turn over for the next question

15

15 (a) Work out the value of $9^{-\frac{3}{2}}$

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Answer ..... *(3 marks)*

15 (b) Work out **all** solutions of the equation

$$8^m = 2^{m^2}$$

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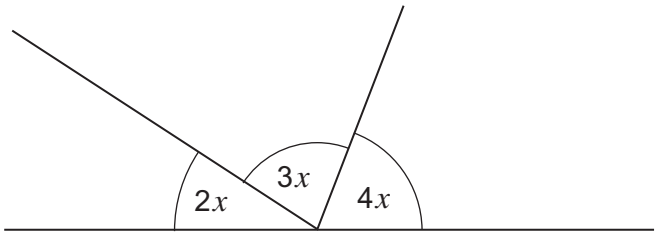
Answer ..... *(3 marks)*

END OF QUESTIONS

6

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

***1** The diagram shows three angles on a straight line.



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Set up and solve an equation in x to help you work out the size of the smallest angle.

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Answer ..... degrees *(4 marks)*

Turn over for the next question

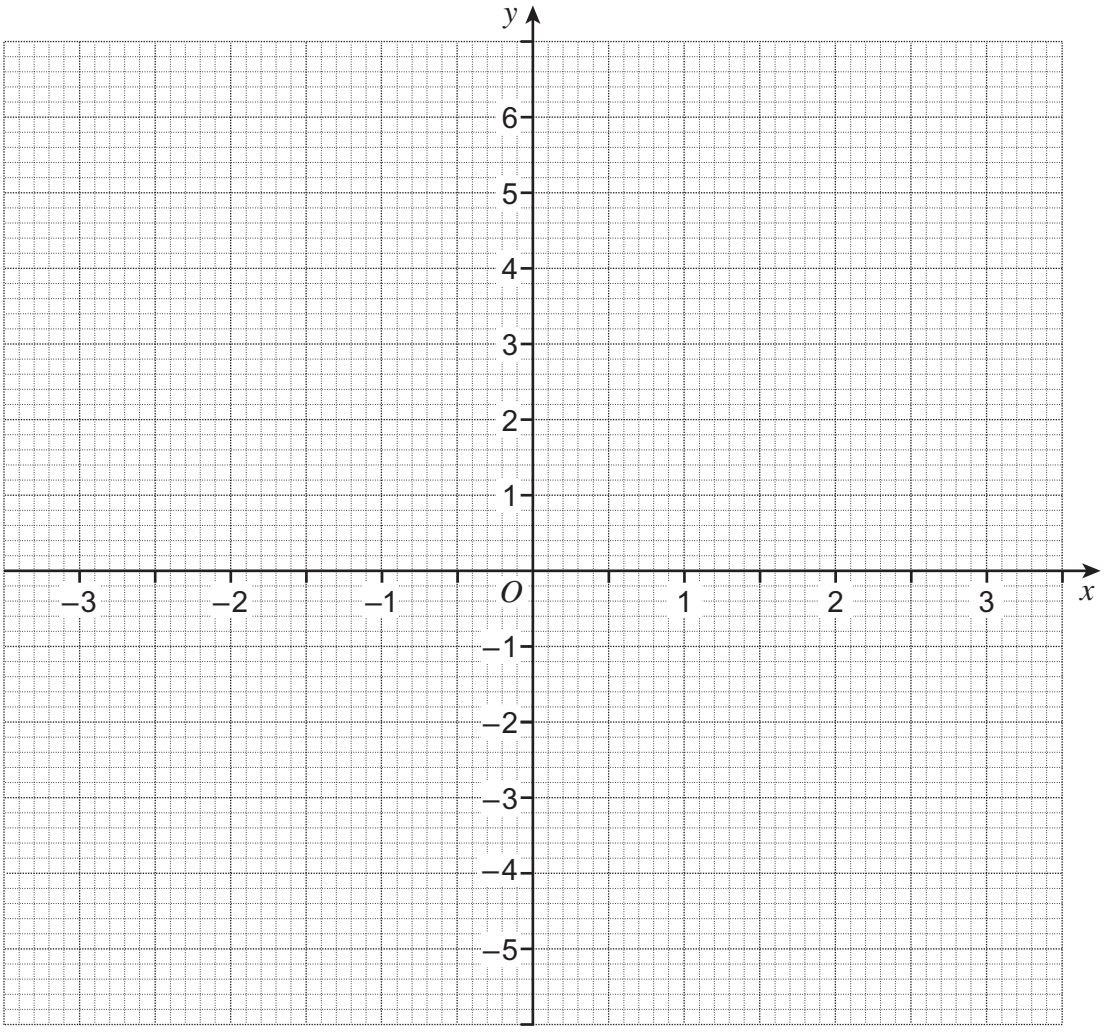
4

2 (a) Complete the table of values for $y = x^2 - 4$

x	–3	–2	–1	0	1	2	3
y	5	0	–3			0	

(2 marks)

2 (b) Draw the graph of $y = x^2 - 4$ for values of x from –3 to 3.



(3 marks)

2 (c) Draw the graph of $y = 2$ on the grid opposite for values of x from –3 to 3.

(1 mark)

2 (d) Write down the x-coordinates of the points of intersection of the two graphs.

Answer ..... and ..... *(2 marks)*

3 A base for a shed has a volume of 3.8 cubic metres.
55% of the base is concrete.
The rest is steel.

A lorry delivers ready-mixed concrete in loads of 6 cubic metres.

How many of these bases can be built with 5 loads of concrete?

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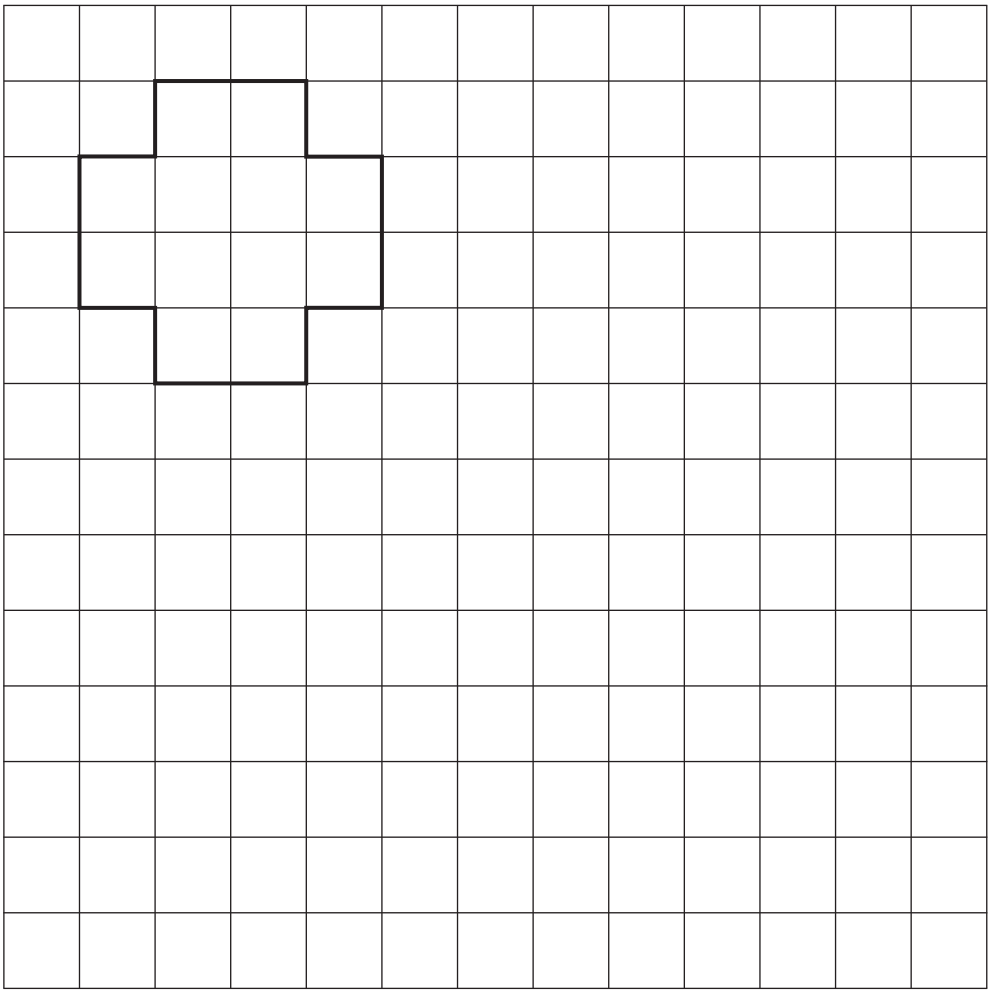
Answer ..... *(3 marks)*

Turn over for the next question

4 The diagram shows a shape on a centimetre grid.



Work out the area of the shape after an enlargement of scale factor 2.
State the units of your answer.

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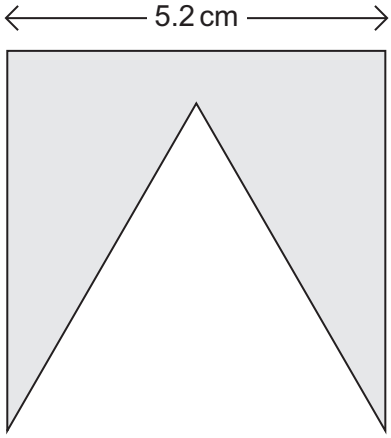
Answer ..... *(3 marks)*

5 This shape is made by cutting out an equilateral triangle from a square.



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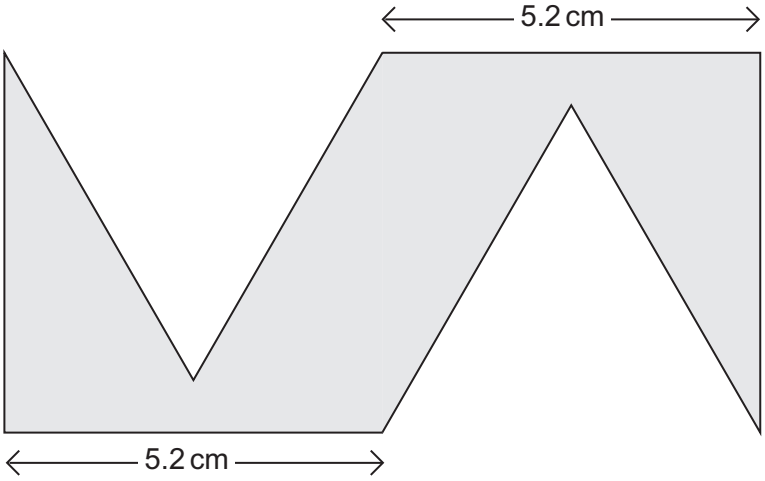
Two of these shapes are then put together to make a new shape as shown below.



Work out the perimeter of this new shape.

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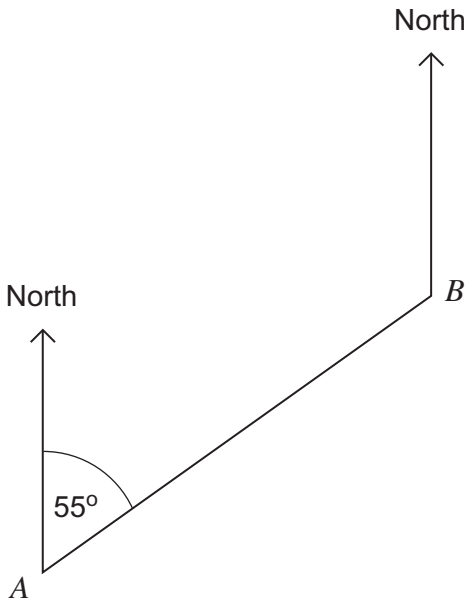
Answer ..... cm *(3 marks)*

6

6 A and B are two towns.



Here is a formula for working out the bearing of A from B.

$$T = F + 180°$$

where T is the bearing of A from B
and F is the bearing of B from A

6 (a) Use the diagram and the formula to work out the bearing of A from B.

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Answer ..... ° *(2 marks)*

6 (b) Give a reason why the formula can only be used for $0° < F \leqslant 180°$

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(1 mark)

6 (c) The bearing of C from D is 342°.

Work out the bearing of D from C.

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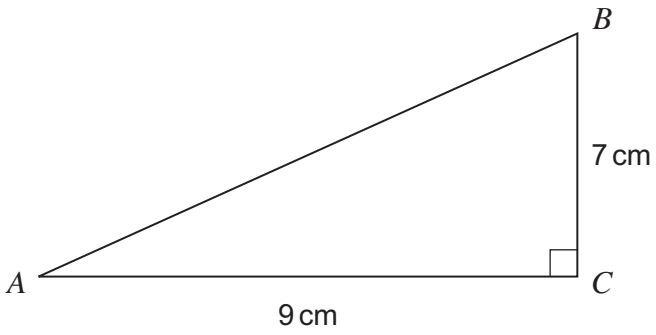
Answer ..... ° *(2 marks)*

7 Work out length AB as a decimal.



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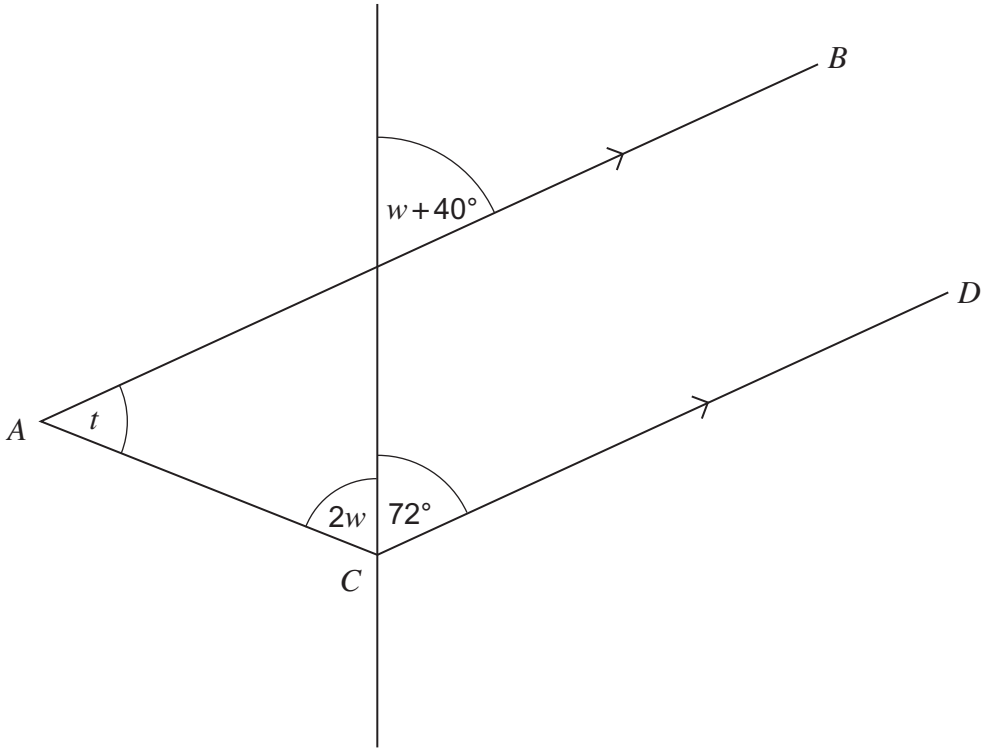
Answer ..... cm *(3 marks)*

8

8 AB is parallel to CD.



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Work out the value of t.

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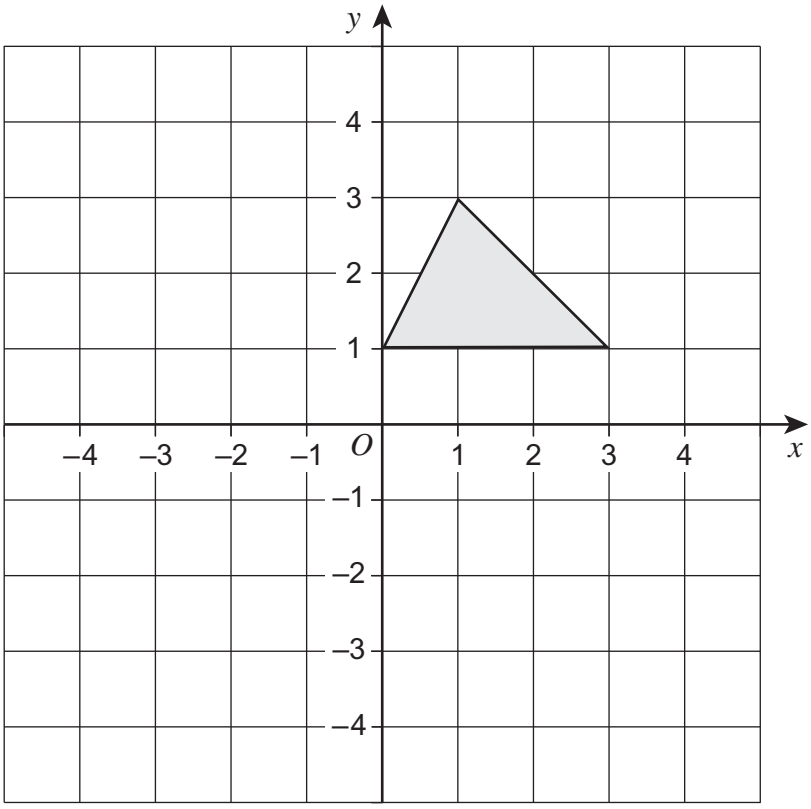
Answer ..... degrees *(5 marks)*

9 Rotate the triangle through 90º clockwise about (0, 1).



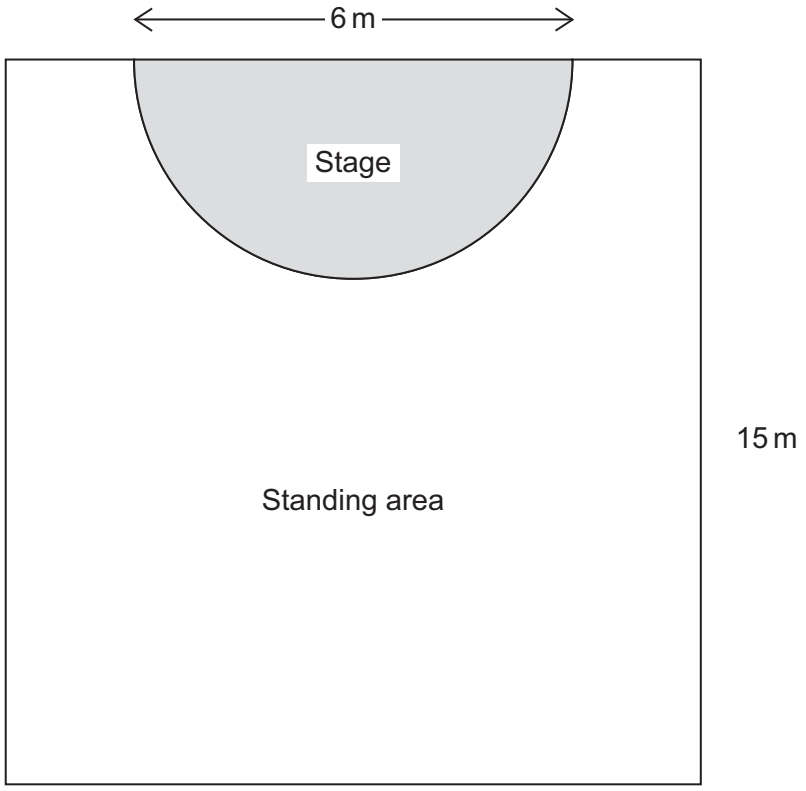
(2 marks)

Turn over for the next question

7

***10** A hall has length 15 metres and width 10 metres.
The stage is a semicircle with diameter 6 metres.

Not drawn accurately



The maximum number of people allowed in the standing area at a concert is calculated using this formula.

Maximum number = Standing area in m^2 ÷ 0.3

Work out the maximum number of people allowed in the standing area at the concert.

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Answer ..... *(5 marks)*

11 A rectangle has length x cm and width y cm.

y cm

Not drawn accurately

x cm

You are given that $x : y = 5 : 2$

11 (a) Write down an equation connecting x and y.

Answer ..... *(1 mark)*

11 (b) Write down an expression for the perimeter of the rectangle in terms of x and y.

Answer ..... *(1 mark)*

11 (c) Work out an expression for the perimeter in terms of x.
Give your answer as simply as possible.

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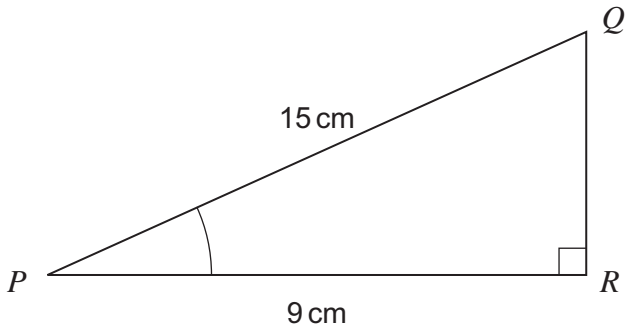
Answer ..... *(2 marks)*

9

12 Work out the size of angle P.



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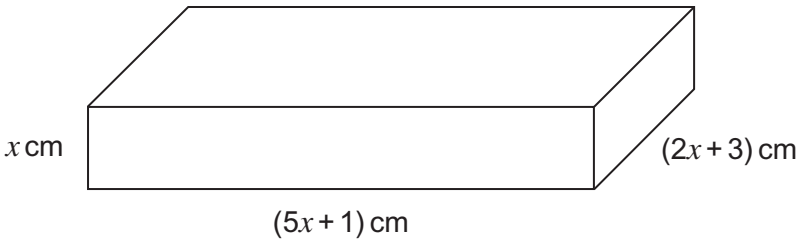
Answer ..... degrees *(3 marks)*

13 The diagram shows a cuboid.
The length is $(5x + 1)$ cm.
The width is $(2x + 3)$ cm.
The height is x cm.



The length is 7 cm longer than the width.

Work out the volume of the cuboid.

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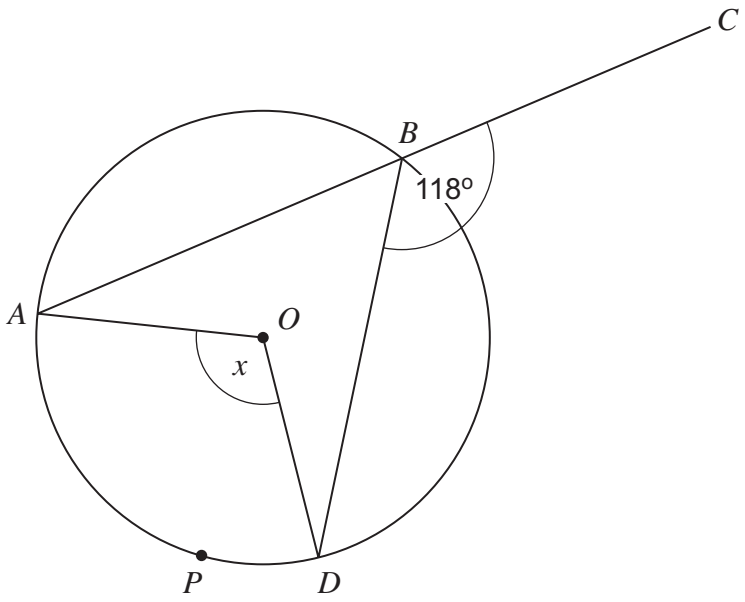
Answer ..... cm^3 *(5 marks)*

8

14 O is the centre of the circle.
ABC is a straight line.
Angle CBD = 118°



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14 (a) Work out the value of x.

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Answer ..... degrees *(3 marks)*

14 (b) P is a point on the minor arc AD.

Explain why angle APD = 118°

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(1 mark)

15 Solve the equation $3x^2 + 4x - 10 = 0$

Give your answers to 2 significant figures.

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Answer ..... *(3 marks)*

Turn over for the next question

7

16 M is directly proportional to r^3
When $r = 5$, $M = 200$

16 (a) Work out the value of M when $r = 8$

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Answer ..... *(4 marks)*

16 (b) Work out the value of r when $M = 3125$

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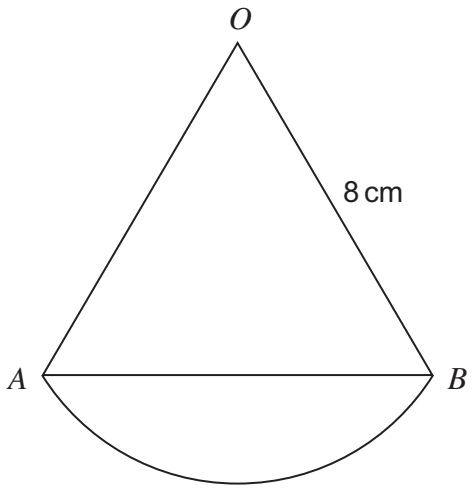
Answer ..... *(3 marks)*

17 The diagram shows an arc AB of a circle, centre O.
Triangle OAB is equilateral.



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Work out the length of arc AB.

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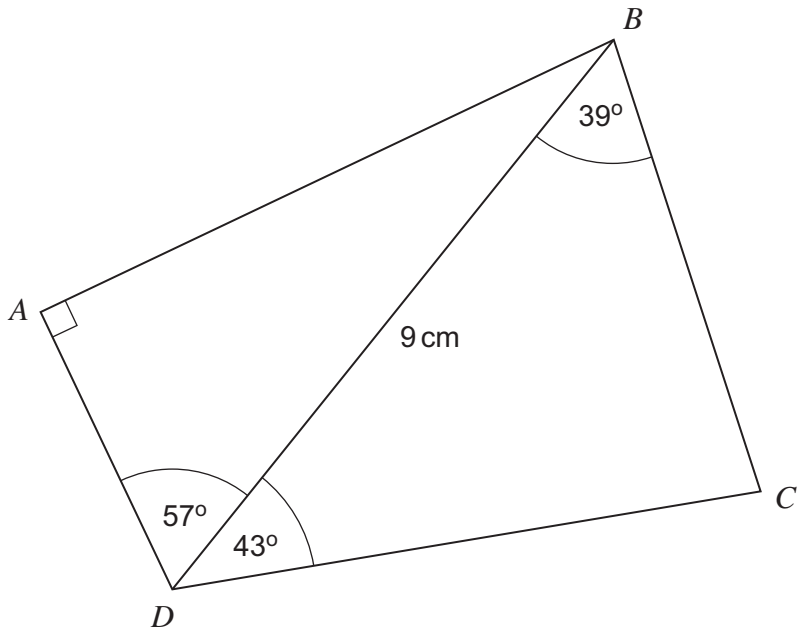
Answer ..... cm *(3 marks)*

Turn over for the next question

10

18 Work out the area of $ABCD$.



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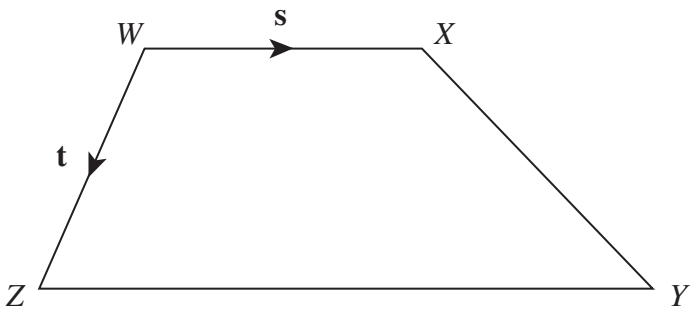
Answer ..... cm^2 *(7 marks)*

19 $WXYZ$ is a trapezium.

$\overrightarrow{WX} = \mathbf{s}$

$\overrightarrow{WZ} = \mathbf{t}$

$ZY : WX = 3 : 2$



19 (a) Write vector $\overrightarrow{ZY}$ in terms of $\mathbf{s}$

.....

Answer ..... *(1 mark)*

19 (b) Work out vector $\overrightarrow{XY}$ in terms of $\mathbf{s}$ and $\mathbf{t}$
Give your answer in its simplest form.

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Answer ..... *(2 marks)*

END OF QUESTIONS

10

1 Linda works in a sandwich factory.

(a) She makes 30 sandwiches every hour.

How long does it take her to make 220 sandwiches?
Give your answer in hours and minutes.

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(a) _____ hours _____minutes **[3]**

(b) Linda's wage is £360 a week.
She receives a 5% wage rise.

Work out Linda's new weekly wage.

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(b) £ _____ **[3]**

(c) Linda makes cheese sandwiches and chicken sandwiches in the ratio 2 : 3.
She makes 200 sandwiches altogether.

How many of these are cheese sandwiches?

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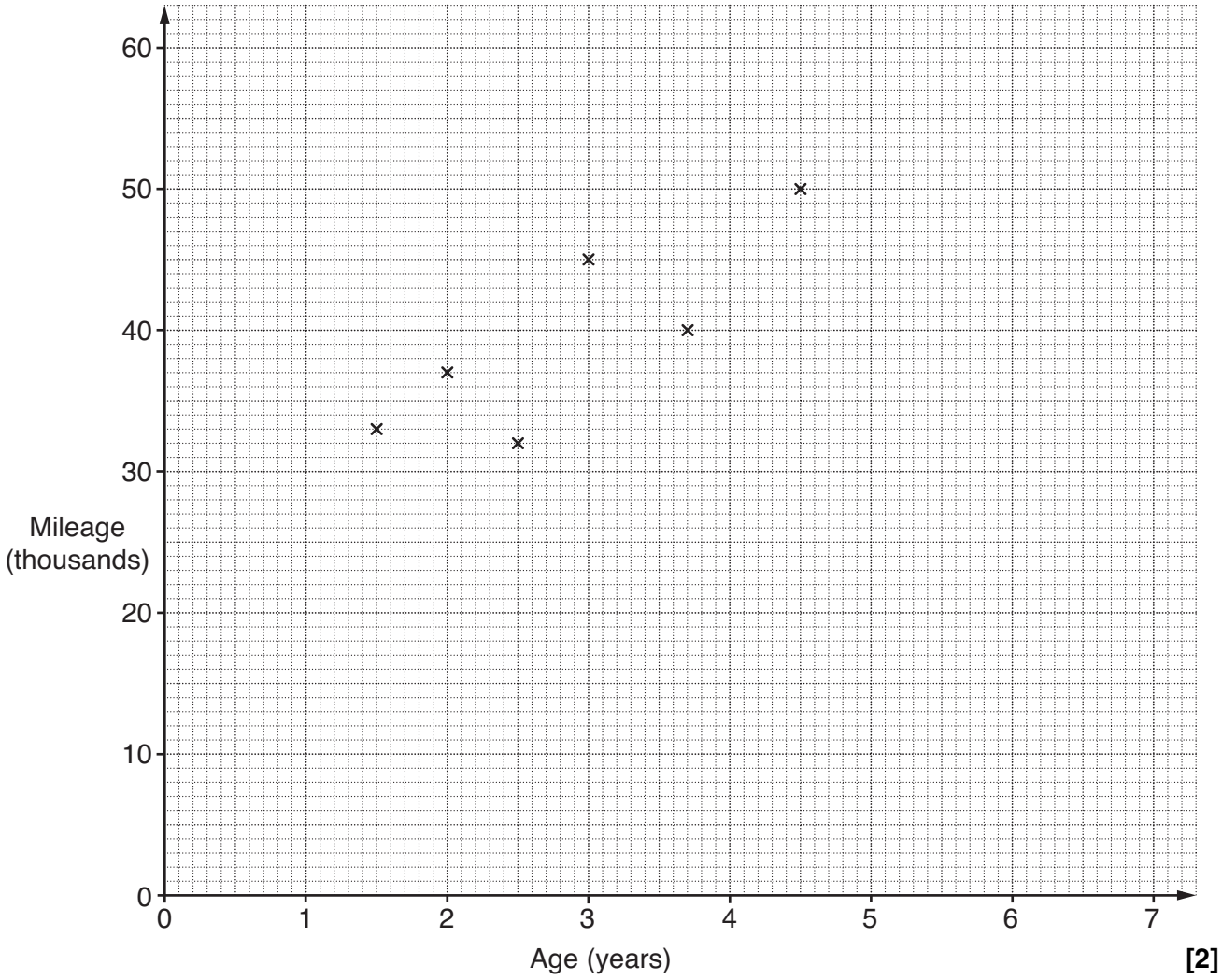
(c) _____ **[2]**

2 As part of a project, Robert records the ages and mileages of some cars.
His results are recorded in this table.

Age (years)	1.5	2	2.5	3	3.7	4.5	5.2	5.5	6	6.5	7
Mileage (thousands)	33	37	32	45	40	50	56	54	58	57	60

(a) Complete the scatter diagram. The first 6 points have already been plotted.



[2]

(b) Describe the strength and type of correlation shown in your diagram.

(b) _____ **[2]**

(c) (i) Draw a line of best fit for these data. **[1]**

(ii) Another car is 3.5 years old.

Use your line of best fit to estimate the mileage of this car.

(c)(ii) _____ thousand miles **[1]**

3 **(a)** $P = 5x - 2y$

Work out the value of P when $x = 3$ and $y = -4$.

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(a) _____ **[2]**

(b) $Q = 2x + 5$

Work out the value of x when $Q = 13$.

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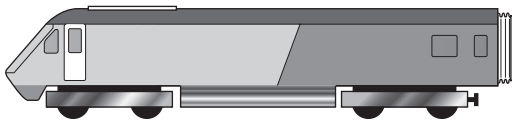
(b) _____ **[2]**

4 A model of a railway engine is made to a scale of 2 cm to 1 m.



(a) The length of the railway engine is 24 metres.

Work out the length of the model.

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(a) _____ cm **[2]**

(b) The height of the model is 8 cm.

Work out the height of the railway engine.

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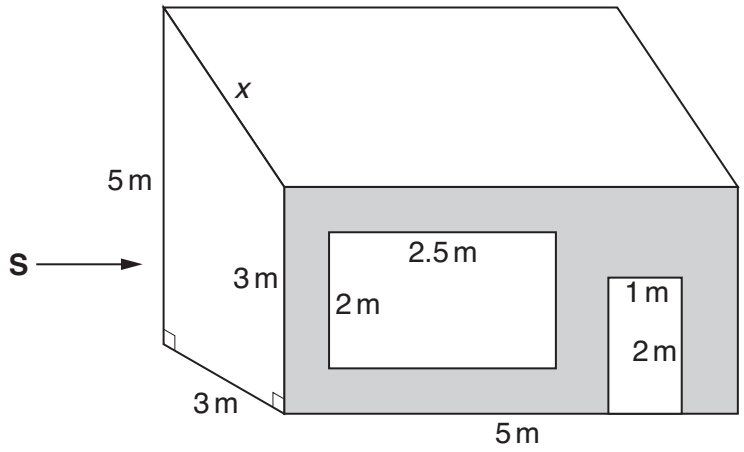
(b) _____ m **[2]**

5 The diagram shows a small shop.
The front of the shop, the window and the door are all rectangles.



(a) Work out the shaded area of the front of the shop.
Give the units of your answer.

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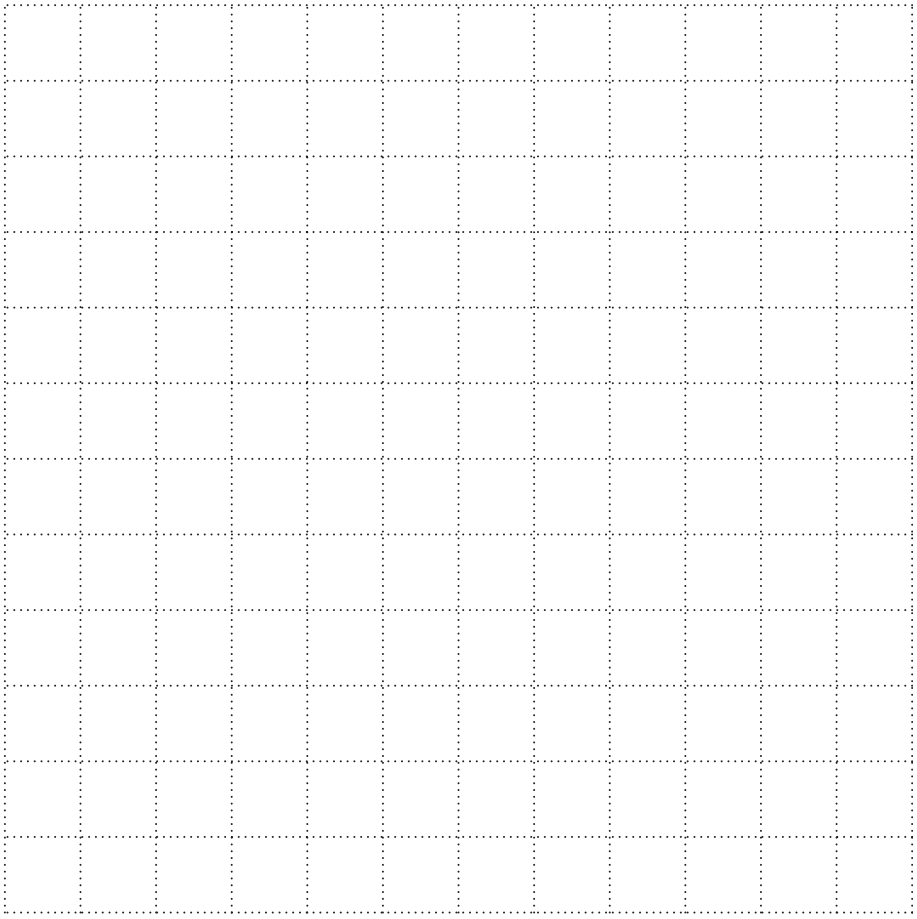
(a) _____ **[3]**

(b) On the centimetre grid, draw the side elevation of the shop (the view from **S**).
Use a scale of 2 cm for 1 m.



[2]

(c) Use your drawing in part **(b)** to find the width of the roof, *x*.

(c) _____ m **[1]**

6 **(a)** Simplify.

$$2xy - 3xy + 4xy$$

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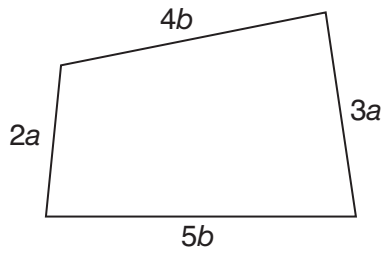
(a) _____ **[1]**

(b) Find an expression for the perimeter of this shape.
Give your answer as simply as possible in terms of a and b.



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(b) _____ **[2]**

(c) Multiply out and simplify.

$$3(2x + 5) + 2(4x - 1)$$

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(c) _____ **[2]**

7 **Estimate** the answer to this calculation.

$$\frac{112 \times 5.8}{0.47}$$

Show clearly the values you use.

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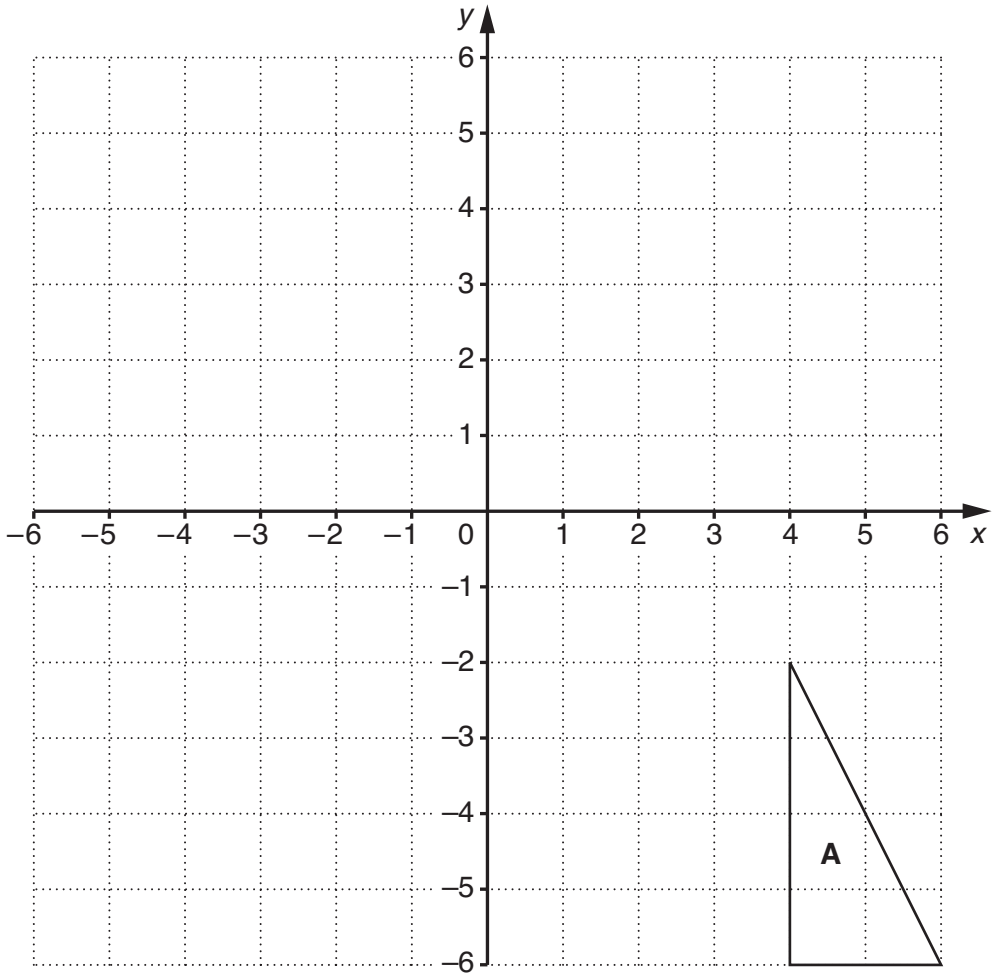
_____ **[2]**

8



(a) Translate triangle **A** by $\begin{pmatrix} -2 \\ 7 \end{pmatrix}$.

Label the image **P**. **[2]**

(b) Enlarge triangle **A** by scale factor $\frac{1}{2}$ using centre (0, 0).

Label the image **Q**. **[2]**

9 **(a)** Show that the equation $x^3 - 10x + 7 = 0$ has a solution between 2 and 3.

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_____

_____ **[3]**

(b) Solve.

$$3(2x - 1) > 12$$

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(b) _____ **[3]**

10 **(a)** Write each of the following in standard form.

(i) 455 000

(a)(i) _____ **[1]**

(ii) 0.000 038

(ii) _____ **[1]**

(iii) 29×10^8

(iii) _____ **[1]**

(b) Work out.

$$\frac{8 \times 10^{12}}{2 \times 10^3}$$

Give your answer in standard form.

.....

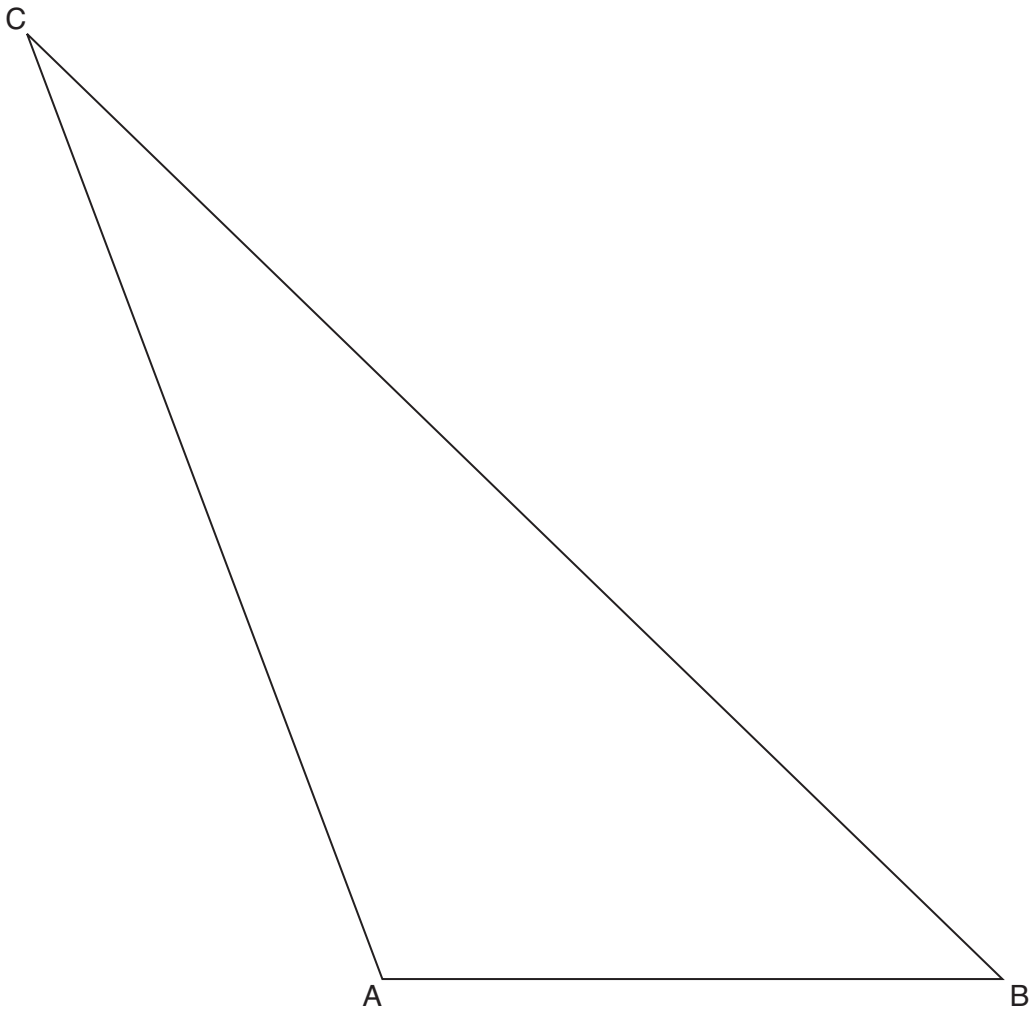
.....

(b) _____ **[2]**

11 *Use ruler and compasses for your constructions in this question.*
Leave in your construction lines.

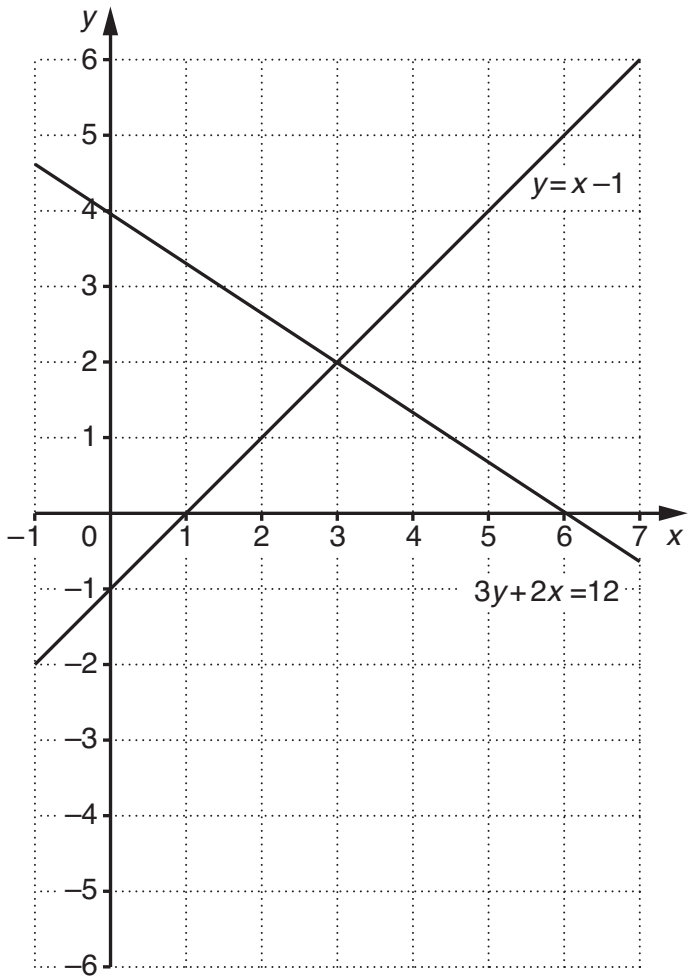
Find and indicate clearly the points which satisfy both of these conditions:

- they are the same distance from BA and BC;
- they are 3.5 cm from A.



[5]

12



(a) Use the diagram to solve these simultaneous equations.

$$3y + 2x = 12$$
$$y = x - 1$$

(a) $x =$ _____ $y =$ _____ **[1]**

(b) By drawing another straight line on the diagram, solve these simultaneous equations.

$$y = x - 1$$
$$y = 2x - 5$$

.....

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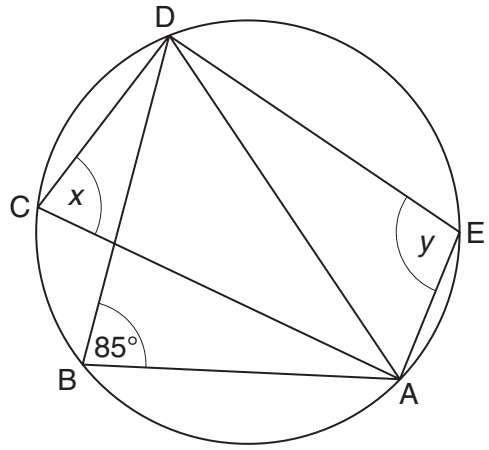
(b) $x =$ _____ $y =$ _____ **[3]**

13 A, B, C, D and E are points on the circumference of a circle.
Angle ABD = 85°.



NOT TO SCALE

(a) Explain why AD is **not** a diameter of the circle.

_____

_____ **[1]**

(b) Find angle *x*.
Give a reason for your answer.

x = _____ ° because _____

_____ **[2]**

(c) Work out angle *y*.
Give a reason for your answer.

y = _____ ° because _____

_____ **[2]**

14 A shopkeeper recorded the amount of money spent by each of 100 customers.
This table summarises the data.

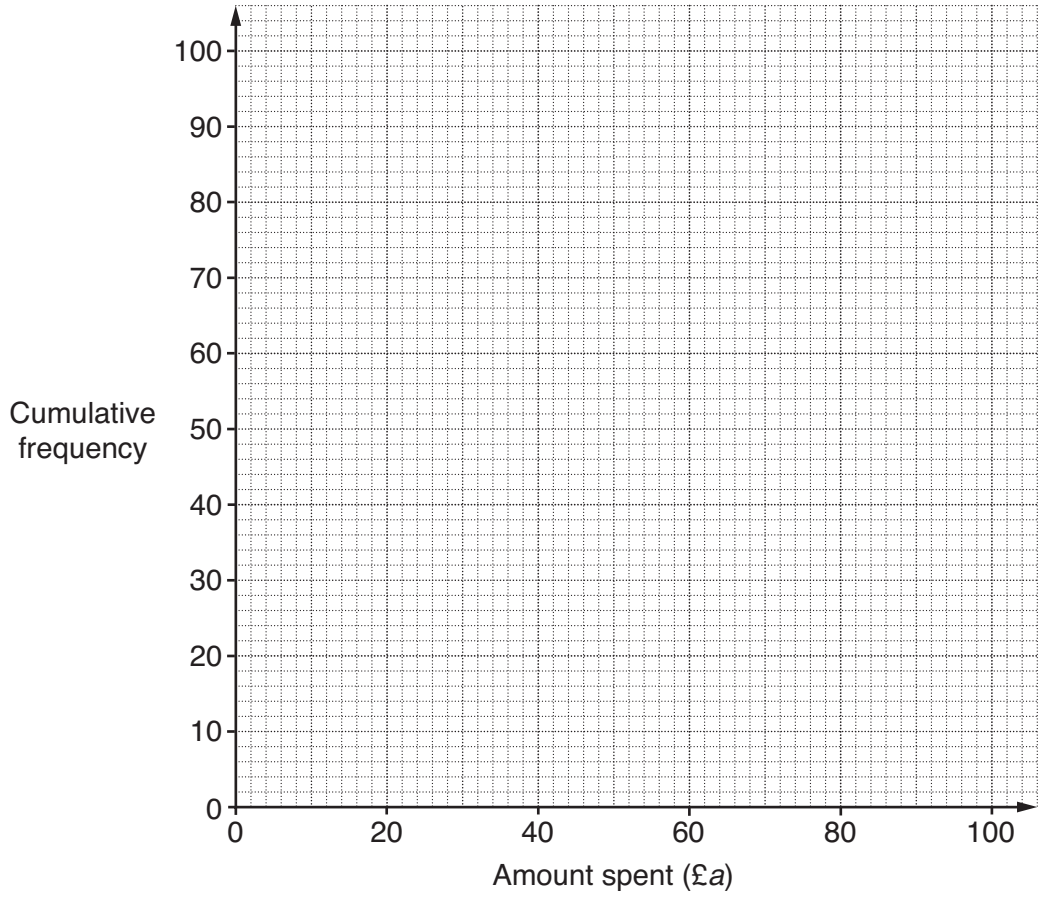
Amount spent (£a)	$0 < a \leqslant 20$	$20 < a \leqslant 40$	$40 < a \leqslant 60$	$60 < a \leqslant 80$	$80 < a \leqslant 100$
Number of customers (frequency)	34	25	10	19	12

(a) Complete the cumulative frequency table.

Amount spent (£a)	$a \leqslant 20$	$a \leqslant 40$	$a \leqslant 60$	$a \leqslant 80$	$a \leqslant 100$
Cumulative frequency	34				100

[1]

(b) On this grid, draw a cumulative frequency graph for these data.



[3]

(c) Use your graph to find the median amount spent.

(c) £ _____ **[1]**

15 (a) (i) Factorise.

$x^2 + 7x + 12$

.....

.....

(a)(i) _____ **[2]**

(ii) Hence, solve this equation.

$x^2 + 7x + 12 = 0$

.....

.....

(ii) _____ **[1]**

(b) Factorise.

$x^2 - 4y^2$

.....

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(b) _____ **[2]**

(c) Expand and simplify.

$(3x + 2)(2x - 5)$

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(c) _____ **[3]**

16 Simplify.

(a) $\sqrt{2} \times \sqrt{50}$

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(a) _____ **[2]**

(b) $\sqrt{2} + \sqrt{50}$

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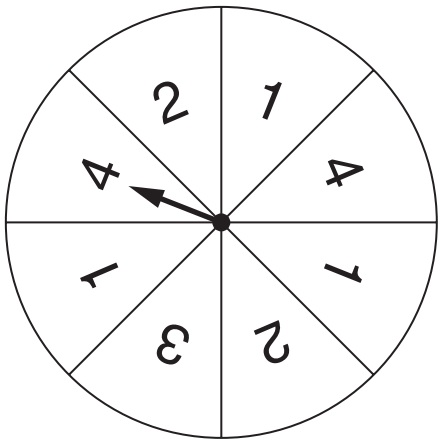
(b) _____ **[2]**

17 The diagram shows a fair spinner with numbers as shown.



Work out the probability of getting exactly one 4 in two spins.

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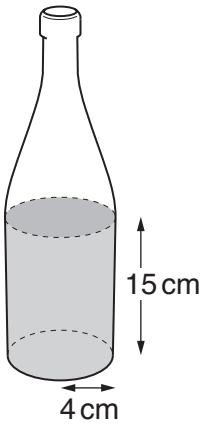
_____ **[3]**

18 The hemispherical bowl of a small glass has internal radius 3 cm.

The lower part of a bottle is a cylinder of internal radius 4 cm.
It contains fruit juice to a depth of 15 cm.



How many of these glasses can be completely filled using all the fruit juice in this bottle?
Leave π in your calculations.

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_____ **[5]**

19 In an experiment, the temperature of a liquid is measured as it cools.
This is the formula that gives the temperature, T °C, of the liquid m minutes after the start of the experiment.

$$T = 60 \times 2^{-m} + 25$$

(a) Work out the temperature of the liquid at the start of the experiment.

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(a) _____ °C **[2]**

(b) Work out the temperature of the liquid 2 minutes after the start of the experiment.

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(b) _____ °C **[2]**

20 Solve algebraically these simultaneous equations.

$$3x + 2y = 7$$
$$y = x^2 - 2x + 3$$

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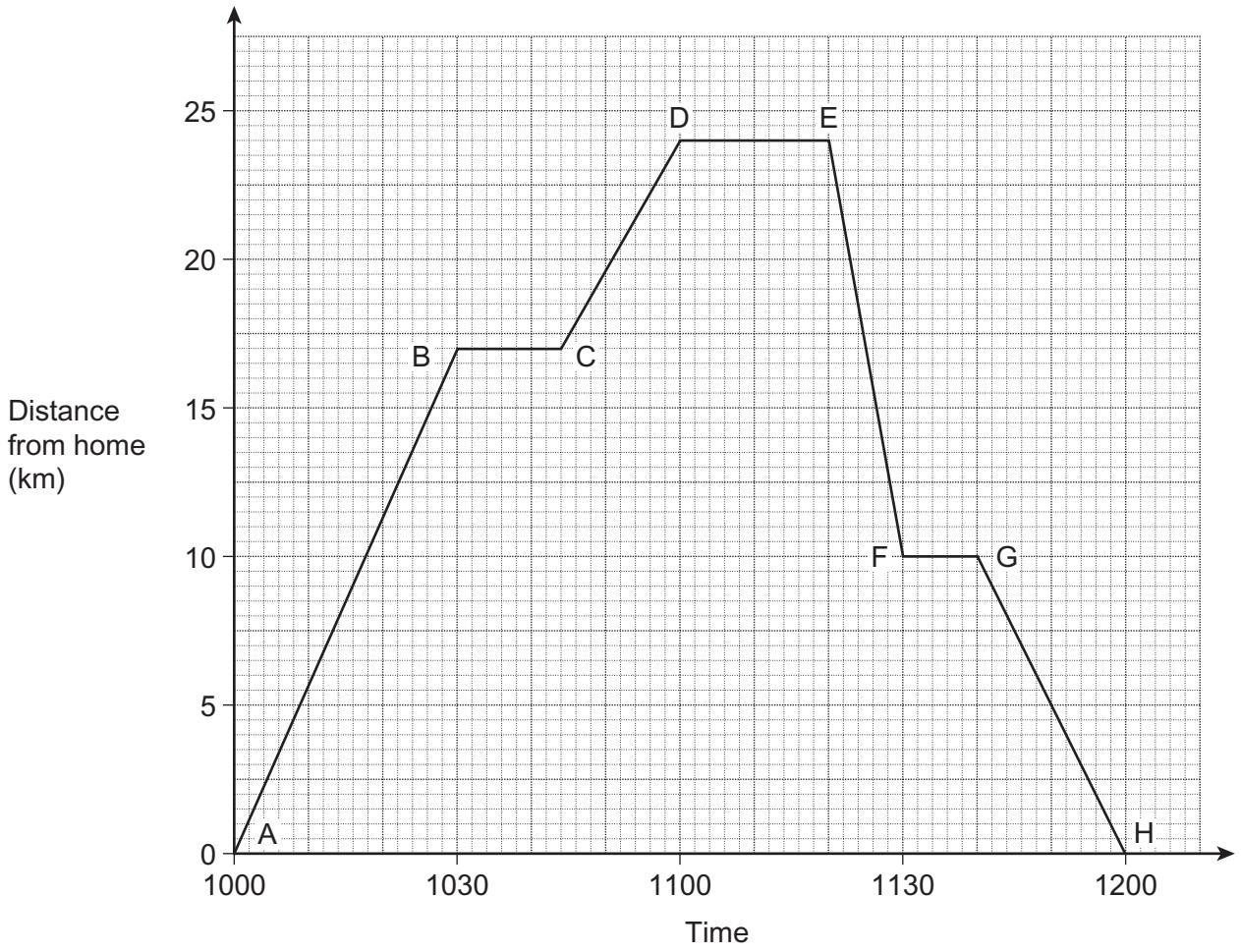
_____ **[7]**

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

1 Amy leaves home in her car at 1000 and returns at 1200.
The graph shows her journey.



1 (a) How far does she travel in her car altogether?

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Answer ..... km *(1 mark)*

1 (b) For how long does the car stop altogether?

.....

.....

Answer ..... minutes *(2 marks)*

1 (c) On which part of her journey is she travelling at the fastest speed?
Give a reason for your answer.

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(2 marks)

2 Here are some of the ingredients for a pie.

Minced lamb	450 g
Potatoes	900 g
Carrots	75 g
Stock	300 ml

Oliver has only 300 g of minced lamb.

How much of the other ingredients should he use?

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Potatoes ..... g

Carrots ..... g

Stock ..... ml *(3 marks)*

8

3 Use approximations to estimate the value of $\dfrac{402.5}{2.19 \times 38.7}$

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Answer ..... *(3 marks)*

4 (a) Expand $w(w + 6)$

.....

Answer ..... *(2 marks)*

4 (b) Factorise fully $8y + 20$

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Answer ..... *(2 marks)*

***5** Post and packing on a parcel is £8.00 for delivery in the UK.
This increases by 40% if the parcel is sent to the USA.

Work out the cost to send the parcel to the USA.

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Answer £ ..... *(3 marks)*

6 The value of $(x - 4)(y + 3)$ is –10

Work out a possible pair of values for x and y.

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x = ... y = ... *(2 marks)*

Turn over for the next question

12

7 (a) Write 126 as a product of prime factors.

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Answer ..... *(2 marks)*

7 (b) Work out the Highest Common Factor (HCF) of 72 and 126

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Answer ..... *(2 marks)*

8 Solve $3(x - 2) = 5x + 8$

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Answer x = ... *(3 marks)*

9 n is an integer.

List the values of n such that $-1 \leqslant n + 3 < 5$

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Answer ..... *(2 marks)*

10 Alice has £4.
Billie has twice as much as Alice.

Billie has two-thirds of the amount Chris has.
The amount Chris has is four-fifths of his age in years.

How old is Chris?

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Answer ..... years *(4 marks)*

13

11 (a) Write 2.46×10^{-3} as an ordinary number.

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Answer ..... *(1 mark)*

11 (b) Work out the value of $(1.8 \times 10^5) \div (9 \times 10^2)$

Give your answer in standard form.

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Answer ..... *(2 marks)*

***12** Grace wants to hire a taxi from home to the railway station.
She normally uses Ace Taxis or Best Cars.

	Fixed charge	Rate per kilometre
Ace Taxis	£2.20	£1.60
Best Cars	£4.00	£1.40

Here is an advert for a new taxi firm, Cozycabs.

Cozycabs

No fixed charge
£1.70 per kilometre

The cost of this journey is the same using Ace Taxis and Best Cars.
Let the distance from home to the railway station be x kilometres.

Use this information to set up and solve an equation in x.

Decide whether it is cheaper for Grace to hire a taxi from Cozycabs for the journey.

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(6 marks)

9

13 Solve the simultaneous equations $5x - 4y = 24$
$x + 2y = 9$

You **must** show your working.
Do **not** use trial and improvement.

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x = ... , y = ... *(3 marks)*

14 Here is a table using powers of 3.

Power of 3	3^0	3^1	3^2	3^3	3^4	3^5	3^6	3^7	...
Value	1	3	9	27	81	243	729	2187	...
Remainder when the value is divided by 11	1	3	9	5	4	1	3	9	...

The repeating pattern of remainders continues.

What is the remainder when 3^{2012} is divided by 11?
Show working to justify your answer.

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Answer ..... *(3 marks)*

6

15 Make y the subject of $x = \dfrac{2 + 3y}{y - 5}$

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Answer ..... *(4 marks)*

16 (a) Write $\sqrt{175}$ in the form $a\sqrt{b}$ where a and b are integers greater than 1.

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Answer ..... *(2 marks)*

16 (b) Simplify fully $\dfrac{24}{\sqrt{3}}$ by rationalising the denominator.

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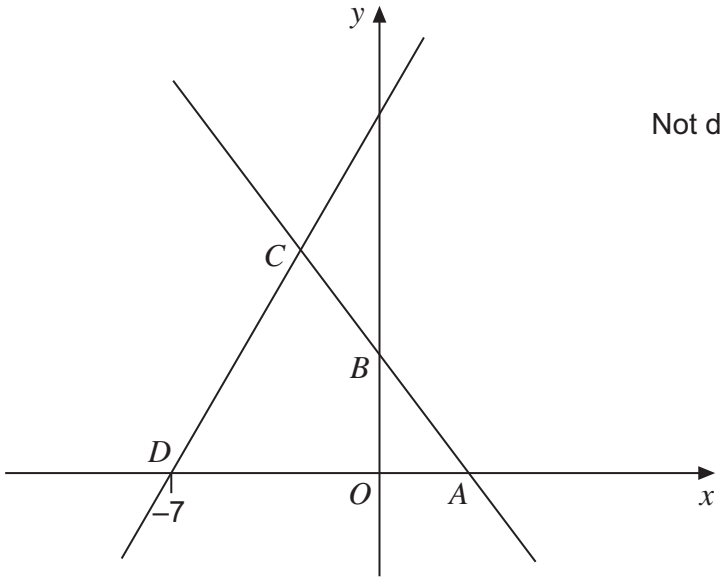
Answer ..... *(2 marks)*

17 In the diagram, points A, B and C lie on the line $2x + y = 6$
B is the midpoint of AC.
D is the point $(-7, 0)$.



Not drawn accurately

Work out the equation of the line through C and D.

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Answer ..... *(5 marks)*

13

18 Here is an identity $(3x + c)(x + c) \equiv 3x^2 - dx + 16$

c and d are integers.

Work out all possible pairs of values of c and d.
You **must** show your working.

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Answer ..... *(5 marks)*

END OF QUESTIONS

5

1 There are blue, red, green and yellow counters in a box.
A counter is taken at random from the box.

(a) Complete the table.

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Colour	Blue	Red	Green	Yellow
Probability	0.05	0.15		0.35

[2]

(b) Work out the probability that a counter taken at random is blue or yellow.

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(b) _____ **[2]**

2 Solve these equations.

(a) $3x + 7 = 2x + 5$

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(a) _____ **[2]**

(b) $\frac{3x}{4} = 6$

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(b) _____ **[2]**

(c) $5(2x + 1) = 20$

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(c) _____ **[3]**

3 **(a)** Show that $\frac{13}{50}$ is the same as 26%.

_____

_____ **[1]**

(b) By writing each of these three fractions as percentages, arrange them in order, smallest first.

$\frac{7}{20}$ $\frac{13}{50}$ $\frac{90}{300}$

Show your working clearly.

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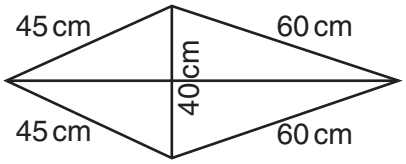
(b) _____ _____ _____**[3]**

smallest

4 Here is a sketch of a kite.



NOT TO SCALE

(a) Using ruler and compasses, make an accurate scale drawing of the kite. **[3]**
Use a scale of 1 cm to represent 10 cm.

(b) Use your scale drawing to work out the length of the longer diagonal of the **real** kite.

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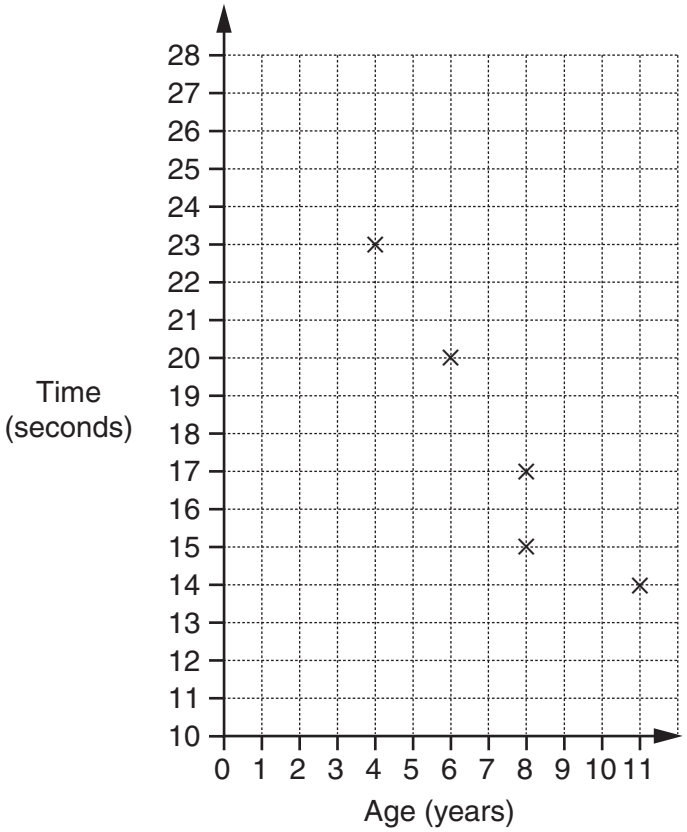
(b) _____cm **[2]**

5 There are 10 children in a junior swimming club.
The table shows each child's age and their time to swim 30 metres.

Age (years)	8	4	11	8	6	10	5	4	9	10
Time (seconds)	17	23	14	15	20	13	22	21	15	16

(a) Complete the scatter diagram.
The first 5 points have already been plotted.



[2]

(b) Describe the correlation shown in the scatter diagram.

_____ **[1]**

(c) Draw a line of best fit on your diagram. **[1]**

(d) Hafisa, aged 7 years, joins the swimming club.

Use your line of best fit to estimate the time she will take to swim 30 m.

(d) _____ s **[1]**

6 Ready salted crisps can be bought in

a pack of 6 bags for £1.38
or a pack of 10 bags for £2.20.

(a) Which of these two packs is better value for money?
Show your working clearly.

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(a) _____ **[3]**

(b) A family pack contains only bags of smokey bacon crisps and bags of cheese and onion crisps.
The ratio of bags of smokey bacon to bags of cheese and onion is 3 : 2.

(i) Phil says that each family pack contains 3 bags of smokey bacon crisps and 2 bags of cheese and onion crisps.

Explain why Phil may be wrong.

_____

_____ **[1]**

(ii) Some family packs are opened and all the bags of crisps put into an empty container.
There are 160 bags of crisps altogether in the container.

How many bags of each flavour are there?

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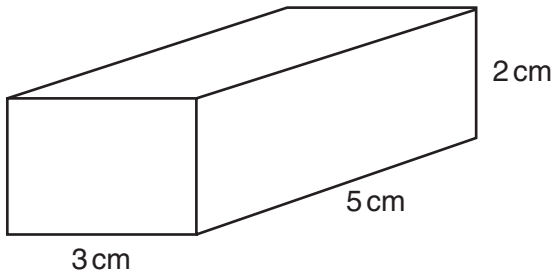
(b)(ii) smokey bacon _____

cheese and onion _____ **[3]**

7



This cuboid has a mass of 135 g.

Work out the density of the cuboid.
Give the units of your answer.

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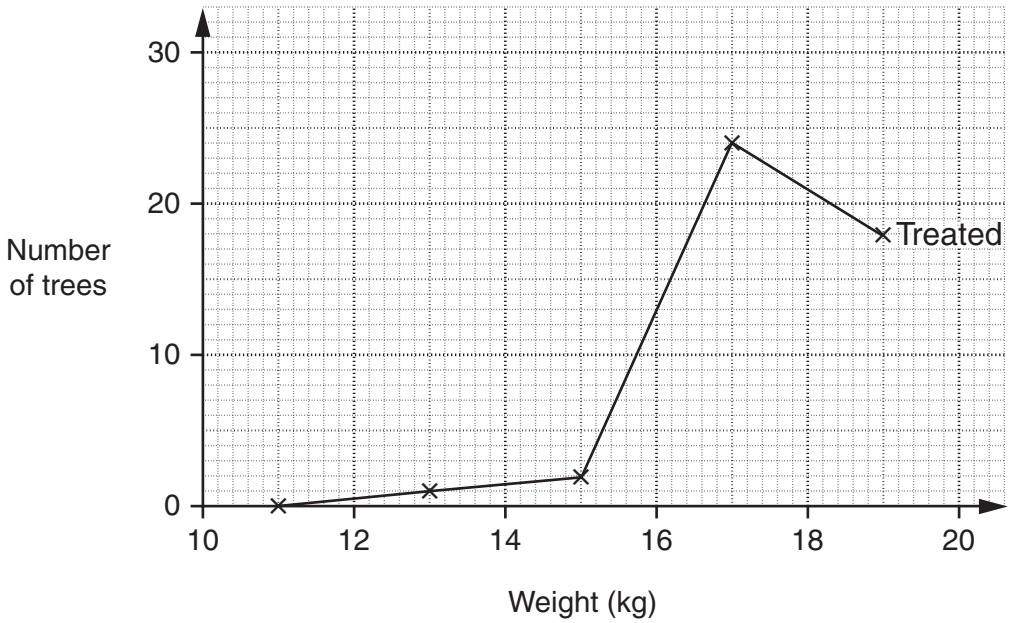
_____ **[4]**

8 In an experiment on pest control and the production of fruit, 45 apple trees were treated with a pesticide and 45 other apple trees were left untreated.
When the apples were picked, the total weight of apples from each tree was recorded.

The frequency polygon shows the distribution of weights of apples from the **treated** trees.



(a) The table shows the distribution of weights of apples from the **untreated** trees.

Weight ($w$kg)	$10 < w \leqslant 12$	$12 < w \leqslant 14$	$14 < w \leqslant 16$	$16 < w \leqslant 18$	$18 < w \leqslant 20$
Number of trees	2	5	13	15	10

On the grid above, draw the frequency polygon for these data. **[2]**

(b) (i) Make one comment to compare the two distributions.

_____

_____ **[1]**

(ii) Is it possible to decide which type of tree, treated or untreated, produces heavier individual apples?
Give a reason for your answer.

_____ because _____

_____ **[1]**

9 **(a)** Calculate an **estimate** of $\frac{3.5 \times 7.8}{0.46}$.

Show clearly the values you use.

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(a) _____ **[2]**

(b) Evaluate.

(i) $(\sqrt{5})^2$

.....

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(b)(i) _____ **[1]**

(ii) 2^{-3}

.....

.....

(ii) _____ **[1]**

(iii) 4^0

.....

.....

(iii) _____ **[1]**

10 A ball is thrown into the air.
The height, h metres, of the ball above the ground after a time t seconds is given by

$$h = 25t - 5t^2.$$

(a) Complete the table of values.

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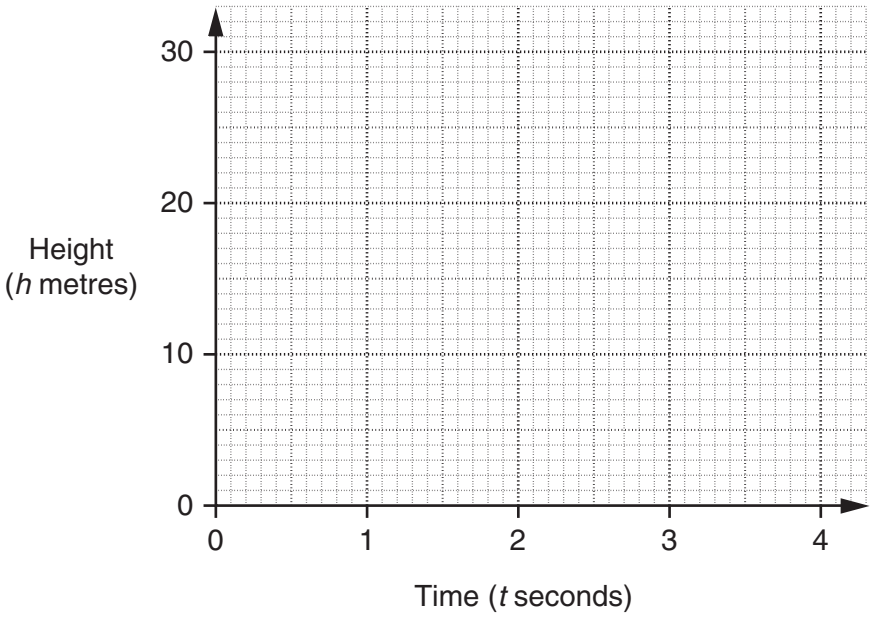
t	0	1	2	3	4
h	0			30	20

[2]

(b) Draw the graph of $h = 25t - 5t^2$ for t from 0 to 4.



[2]

(c) Use your graph to estimate

(i) the maximum height of the ball above the ground,

(c)(i) _____ m **[1]**

(ii) the time when the ball is 15 m above the ground.

(ii) _____ s **[1]**

11 A box of apples weighs 25 kg, correct to the nearest kilogram.

(a) Explain why the **upper bound** of the weight of 10 of these boxes of apples is 255 kg.

_____

_____

_____ **[1]**

(b) 10 of these boxes of apples are put onto a pallet.
The pallet weighs 8 kg, correct to the nearest kilogram.

Work out the **least** possible total weight of the 10 boxes of apples and the pallet.

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(b) _____ kg **[2]**

12 **(a)** Rearrange this formula to make x the subject.

$$y = 3x - 2$$

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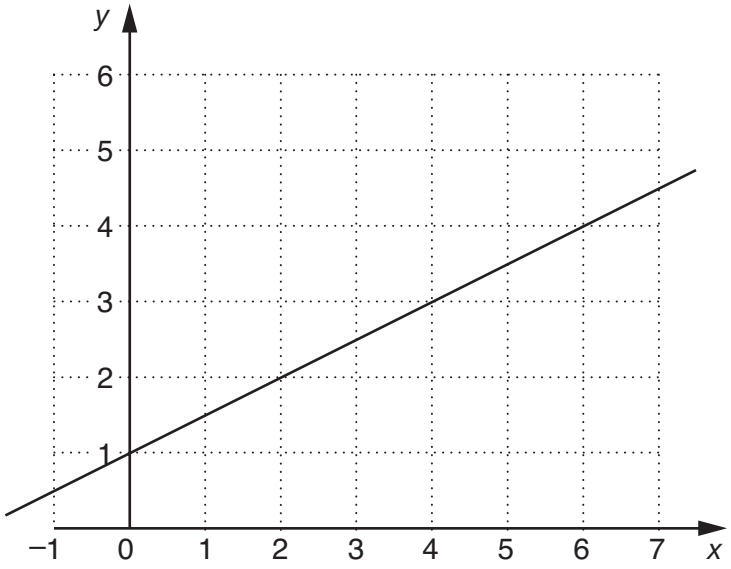
.....

(a) _____ **[2]**

(b)



(i) Work out the gradient of this line.

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(b)(i) _____ **[2]**

(ii) Hence, write down the equation of the line.

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(ii) _____ **[2]**

(c) Work out the coordinates of the midpoint of the line joining (–3, 3) and (4, 5).

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(c) (_____ , _____)**[2]**

13 The price of a cooker is reduced by 20% to £320.

Work out the price of the cooker **before** the reduction.

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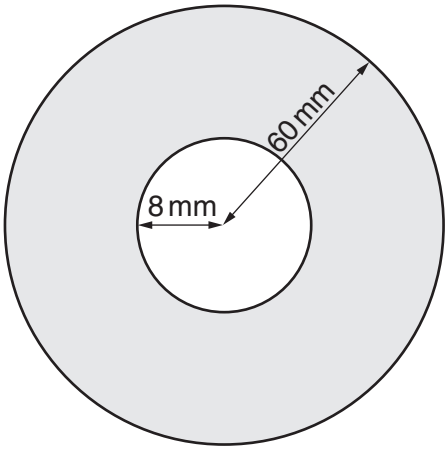
£ _____ **[3]**

14 A CD is a circular disc of radius 60 mm with a hole of radius 8 mm cut from the middle.



NOT TO SCALE

Work out the area of one side of a CD, shown shaded.
Give your answer as a multiple of π.

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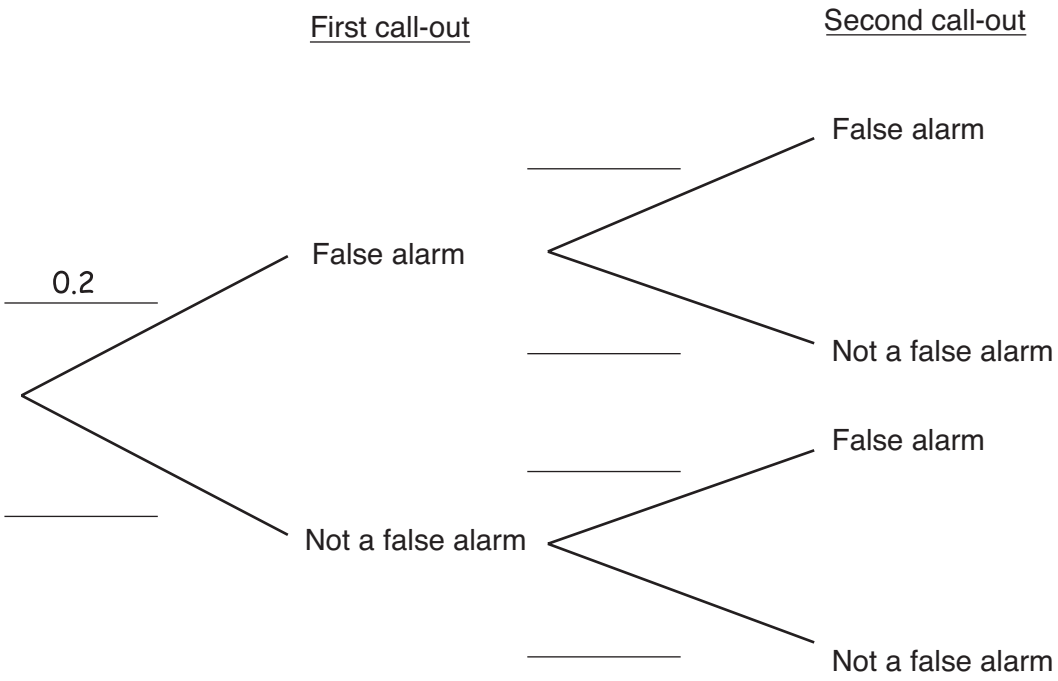
_____ mm^2 **[4]**

15 A fire station manager knows that the probability that any call-out is a false alarm is 0.2.

(a) Complete the tree diagram for the next two call-outs.



[2]

(b) Work out the probability that both of the next two call-outs are **not** false alarms.

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(b) _____ **[2]**

16 **(a)** Solve.

$$(x + 5)(x - 1) = 0$$

.....

(a) _____ **[1]**

(b) Multiply out these brackets and simplify your answer.

$$(2y + 3)(5y - 2)$$

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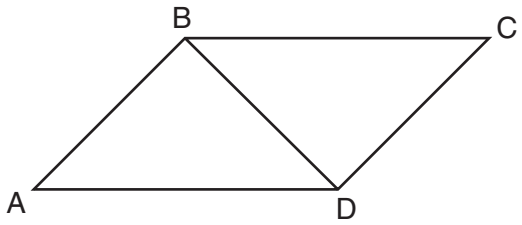
(b) _____ **[3]**

17 ABCD is a parallelogram.



NOT TO SCALE

Prove that triangle ABD is congruent to triangle CDB.

_____

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_____ **[5]**

18 y is **inversely** proportional to the square of x.
When $y = 9$, $x = 2$.

(a) Use this information to find a formula connecting y and x.

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(a) _____ **[2]**

(b) Find the value of y when $x = 10$.

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(b) _____ **[1]**

(c) Find the values of x when $y = 4$.

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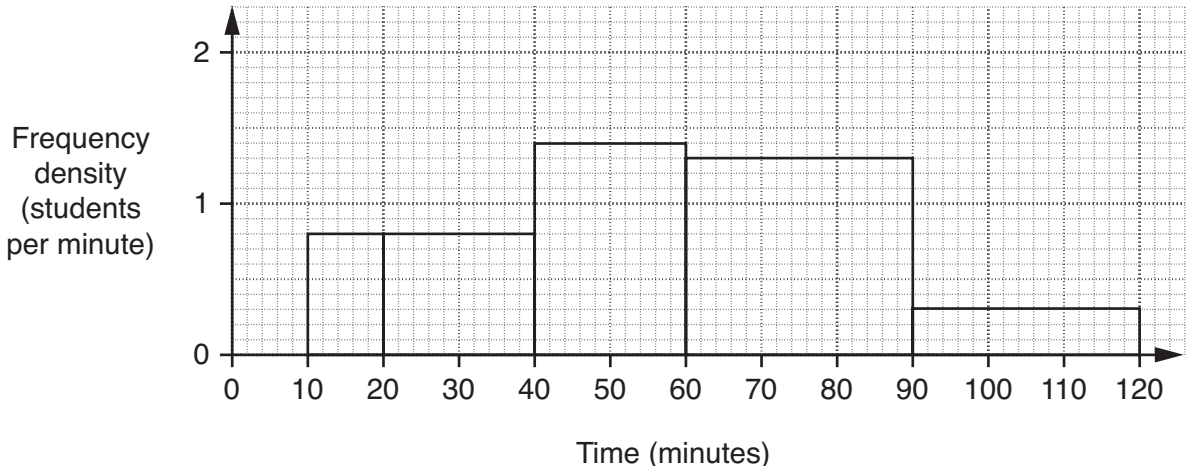
(c) _____ **[2]**

19 Some Year 12 students were each asked how many minutes they exercised each day.
The histogram shows the distribution of their times.



(a) Josie says, "There are as many students exercising between 10 and 20 minutes as there are exercising between 20 and 40 minutes".

Explain why Josie is wrong.

_____

_____ **[1]**

(b) Calculate an estimate of the number of these students who exercised for 50 minutes or more.

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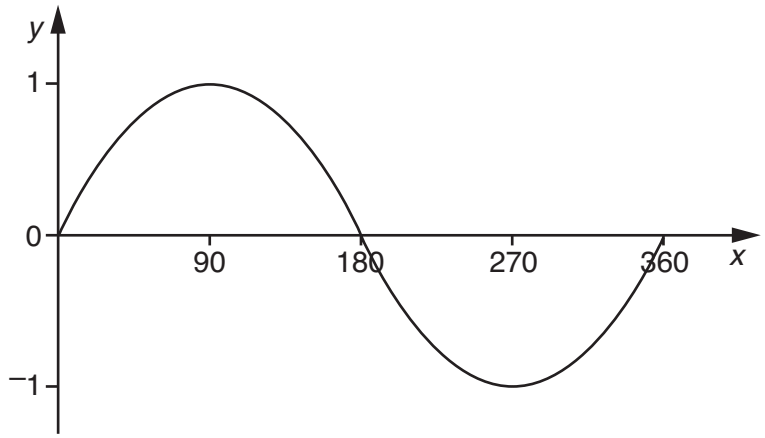
(b) _____ **[3]**

20 Here is the graph of $y = \sin x°$ for $0 \leqslant x \leqslant 360$.



One solution of $\sin x° = 0.5$ is $x = 30$.

(a) Find another solution of $\sin x° = 0.5$ for $0 \leqslant x \leqslant 360$.

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(a) _____ **[1]**

(b) Find the solutions of $\sin x° = -0.5$ for $0 \leqslant x \leqslant 360$.

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(b) _____ **[2]**

21 Solve algebraically these simultaneous equations.

$$x^2 + y^2 = 17$$
$$y = x - 3$$

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_____ **[6]**