AQA

Please write clearly in block capitals.

Centre number ☐☐☐☐☐ Candidate number ☐☐☐☐

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
MATHEMATICS

F

Foundation Tier   Paper 2 Calculator
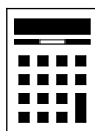
Thursday 6 June 2019   Morning   Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
- a calculator
- mathematical instruments.

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- 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 you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

Advice

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

For Examiner's Use	
Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22–23	
24–25	
26–27	
TOTAL	

Any writing in blue indicates what must be written in order to answer the questions and get the marks. The worked solutions have been designed to show the smallest amount of work which needs to be done to answer the question.

Anything written in green in a cloud doesn't have to be written in the exam.

Anything written in orange in a rectangle doesn't have to be written in the exam and is there to show what should be put into a calculator or measured using a ruler or protractor.

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

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Answer **all** questions in the spaces provided

1 Circle the number that is one **less** than a cube number.

[1 mark]

| 20 | 22 | 24 | 26 |

A cube number is the result of cubing a whole number. e.g. 8 is a cube number as 2^3 = 2 x 2 x 2 = 8

2 Circle the fraction which is equal to 0.25

[1 mark]

$\boxed{S⇔D}$ Type each fraction into the calculator then convert into a decimal by pressing the button on the left

$\dfrac{1}{40}$ $\qquad$ $\dfrac{2}{5}$ $\qquad$ $\dfrac{3}{12}$ $\qquad$ $\dfrac{4}{100}$

3 Here is a number line.

3 ——————— A ——————— 4

Which number is at A?

Circle your answer.

[1 mark]

| 3.3 | 3.55 | 3.6 | 3.8 |

The difference between 3 and 4 is 1. Dividing this by the 5 divisions between them on the number line gives what it is going up in

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4 How many millimetres are equal to 3.27 metres?

Circle your answer.

[1 mark]

32.7   327   3270   32 700

There are 1000 millimetres in a metre

5 Which is longer, $\frac{3}{4}$ of a day   or   1000 minutes?

You **must** show your working.

[3 marks]

Convert 3/4 of a day into minutes so it can be compared to 1000 minutes. There are 24 hours in a day and 60 minutes in an hour

Answer _____

7

Turn over ▶

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6 (a) Use your calculator to work out $\dfrac{9.75^3}{1.875} + 6.4^2$

Give your answer as a decimal.
Write down your full calculator display.

[2 marks]

Type it all into the calculator exactly as it is above

Answer _____

6 (b) Is your answer to part (a) sensible?

Check by rounding each of 9.75, 1.875 and 6.4 to the nearest whole number.
You **must** show your working.

[3 marks]

9.75 to the nearest whole number is 10 as the 7 in the first decimal place causes the 9 to round up. Round the other numbers then put them back into the calculation in part (a). If the answer to part (a) is close to our approximation, it is sensible

Tick a box.

[ ] Sensible   [ ] Not sensible

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7 Complete the bank statement.

Money received

Money spent

Money in account

[3 marks]

Date	Description	Credit (£)	Debit (£)	Balance (£)
01/04/2019	Starting balance			
05/04/2019	Council tax		189.34	72.09
10/04/2019	Refund			86.75
12/04/2019	Salary	1430.29		

Work out the money in the account before the council tax

The balance increased from £72.09 to £86.75. The difference is the amount of money gained for the refund

The salary is added to the previous balance

Turn over for the next question

Turn over ▶
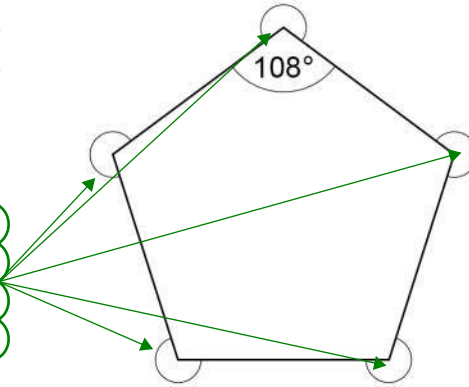
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8 (a) The interior angle of a regular pentagon is 108°

Work out the sum of the five **reflex** angles at the vertices of a regular pentagon.

[3 marks]

Sum means to add up all of the numbers

Not drawn accurately

108°

These are the reflex angles and they are all the same as the shape is regular (all interior angles are the same)

There are 360 degrees in total around a point

Answer _____ degrees
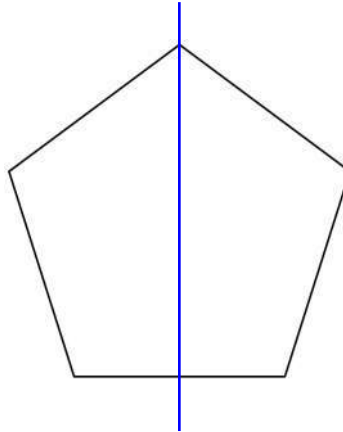
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Omar asks Harry,

"How many lines of symmetry does a pentagon have?"

Harry assumes it is a regular pentagon.

His answer is 5.

8 (b) Draw the lines of symmetry on this regular pentagon.

[1 mark]

This is one of the lines of symmetry. Both sides of the line are a reflection of each other
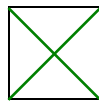
8 (c) Omar then says,

"What if the pentagon is **not** regular?"

For a pentagon that is **not** regular, what is true about the number of lines of symmetry?

Tick **one** box.

[1 mark]

This is an example of an irregular pentagon with 1 line of symmetry. So it can't be the first option. Is it possible to draw one with 2?

There must be 0

There could be 0 or 1

There could be 0, 1 or 2

There could be any number up to 5

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5

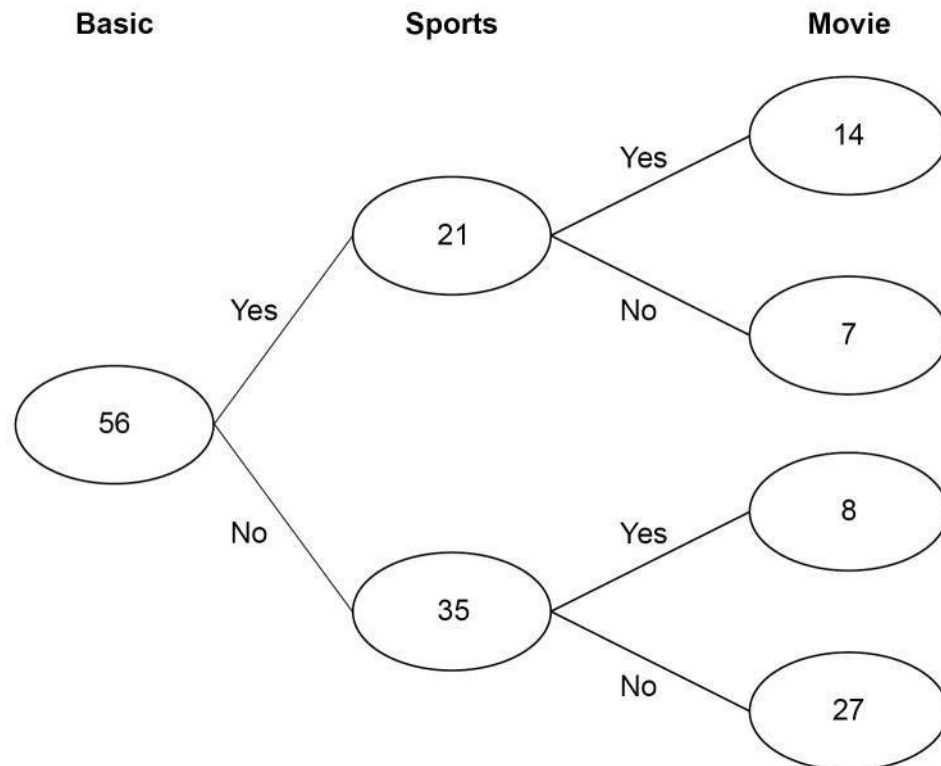**9** 56 customers pay for satellite television.

They **all** have the Basic package for £24.50 per month.

Some also have

the Sports package for £27.50 extra per month

the Movie package for £18 extra per month.

The frequency tree shows the number of customers with each package.

Basic	Sports	Movie

14

Yes

21

Yes

No

7

56

No

8

Yes

35

No

27

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In total, how much per month do the 56 customers pay?

[4 marks]

First work out how much all the 56 customers who have the Basic package for £24.50 per month have to pay in total.
Add the total amount the Sports package customers have to pay and the total amount the Movie package have to pay

Answer £_____

Turn over for the next question

4

Turn over ▶

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10 Zoe is thinking of a number.

$$\frac{3}{10} \text{ of } 90 = \frac{1}{2} \text{ of her number}$$

What number is she thinking of?

[3 marks]

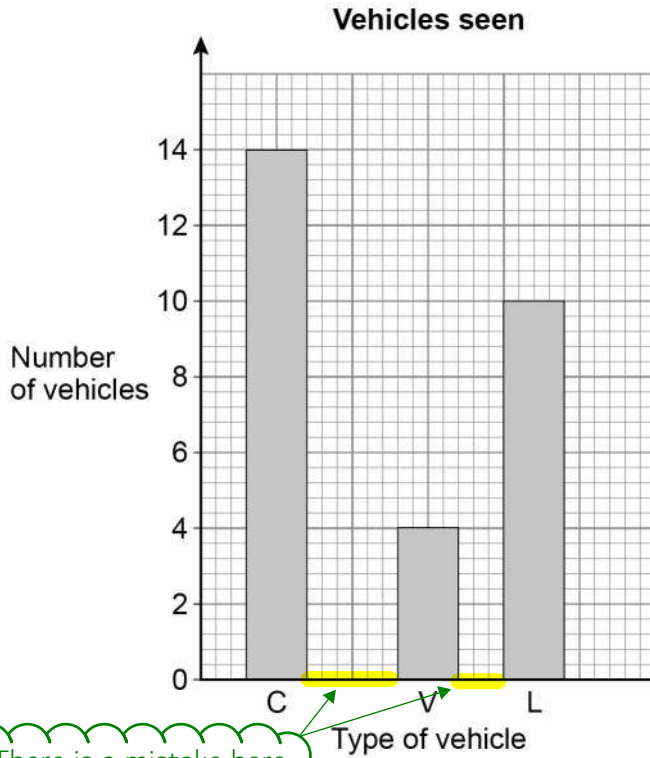'Of' means to multiply. The opposite of halving a number is multiplying by 2

Answer _____

11 On a journey, Laura sees 30 vehicles.

Each vehicle is a car, a van or a lorry.

She draws this bar chart.

There is a mistake which has something to do with this

Vehicles seen

There is a mistake here

Make **two** criticisms of her bar chart.

[2 marks]

Criticism 1 _____

_____

_____

_____

Criticism 2 _____

_____

_____

_____

5

Turn over ▶

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IB/M/Jun19/8300/2F

12   A drawing has a scale of   1 : 40

> This means every unit of length on the drawing represents 40 units of length in the real world

On the drawing, a bedroom is a rectangle measuring 10 cm by 18 cm

A kitchen has an actual area of 300 000 cm^2

Which has the bigger actual area, the kitchen or the bedroom?

You **must** show your working.

[4 marks]

> Area of rectangle = length x width
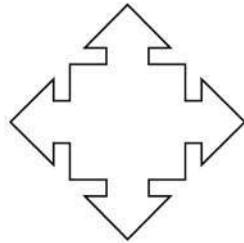
Answer _____
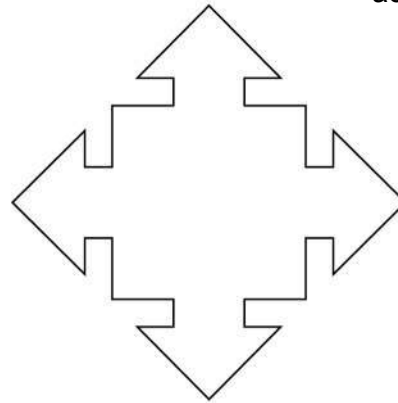
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Do not write outside the box

13 Here are two similar shapes, A and B.

Not drawn accurately

A

B

length of edges in A : length of edges in B = 2 : 5

The perimeter of A is 210 mm

Work out the perimeter of B.

[2 marks]

The perimeter is the sum of the edges, so if all of the lengths are scaled up the perimeter will be scaled up by the same factor. 2 parts of the ratio represents the perimeter of A. Work out what 5 parts are worth to find the perimeter of B

Answer _____ mm

6

Turn over ▶

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14 There are 135 passengers on a plane.

3 of the passengers in Business Class are flying for the first time.

In total, there are 15 passengers in Business Class.

$\frac{1}{4}$ of the passengers **not** in Business Class are flying for the first time.

**14 (a)** In the Venn diagram,

ξ = passengers on the plane

B = passengers in Business Class

F = passengers flying for the first time.

Complete the Venn diagram.

[4 marks]

Passengers in Business Class flying for the first time

ξ

B

F

Passengers in Business Class not flying for the first time

Passengers not in Business Class flying for the first time

Passengers not in Business Class not flying for the first time
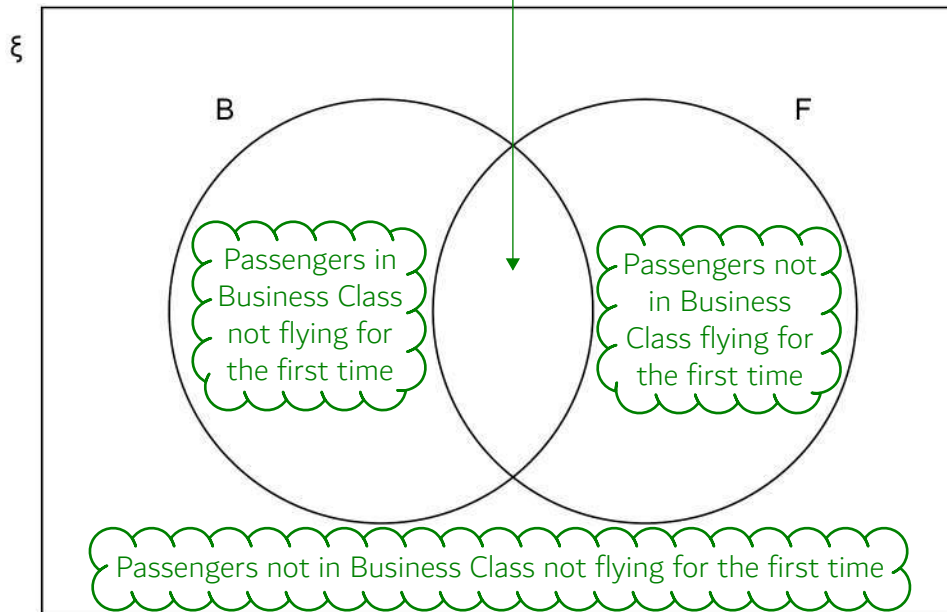
14 (b)   One of the passengers is chosen at random.

Write down the probability that the passenger is in Business Class.

[1 mark]

15 out of the 135 passengers are in Business Class

Answer _____

15   A line has the equation $y = x + 3$

15 (a)   Write down the coordinates of the point where the line intersects the y-axis.

[1 mark]

x-coordinate   *y-coordinate*

Answer   (_____ , _____)

x = 0 when the line intersects the y-axis.
Substitute this into the equation to find y

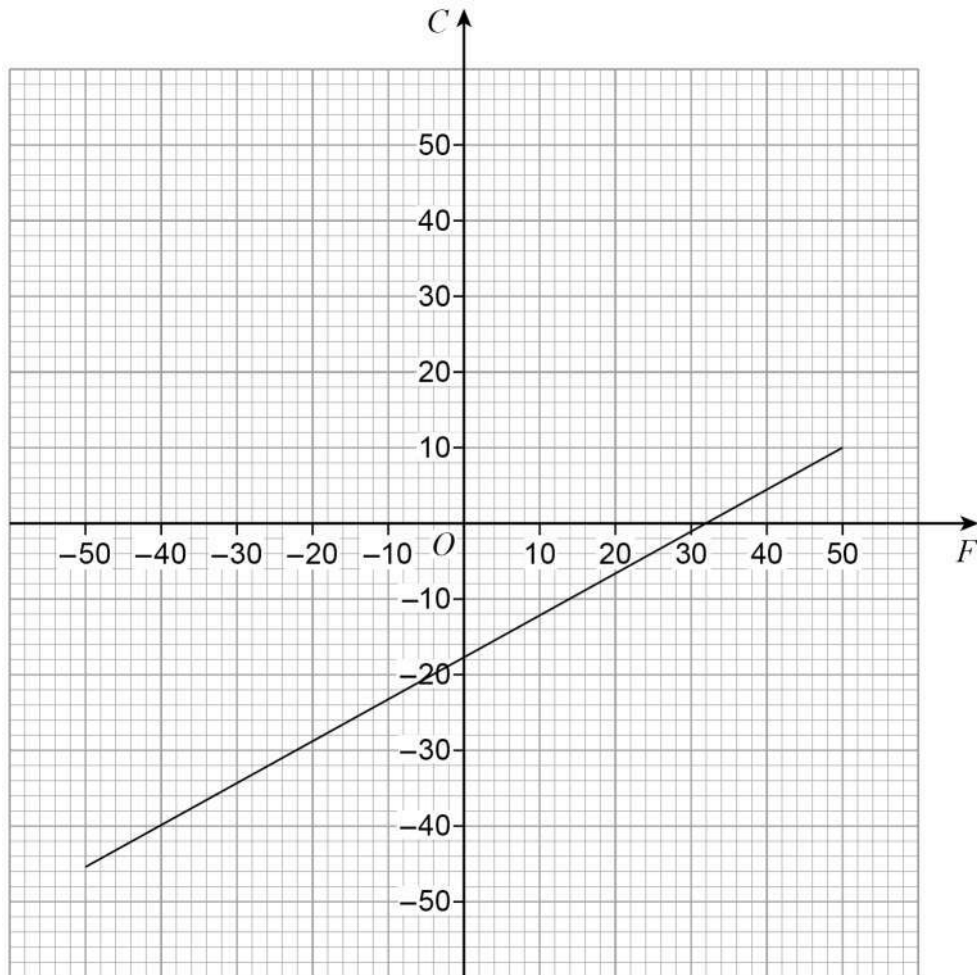**15 (b)**   Write down the coordinates of the point where the line intersects the x-axis.

[1 mark]

Answer   (_____ , _____)

y = 0 when the line intersects the x-axis. Substitute
this into the equation and rearrange to find x

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16 The graph below is used to convert between

temperature in degrees Fahrenheit (F)

and

temperature in degrees Celsius (C).

16 (a) Use the graph to convert 40 degrees Fahrenheit into degrees Celsius.

[1 mark]

Answer _____ degrees Celsius

Read up from 40 degrees Fahrenheit to
the line then across to the degrees Celsius

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At one temperature, T,

the number of degrees Celsius is **double** the number of degrees Fahrenheit.

The graph of $C = 2F$ can be drawn to help find this temperature.

16 (b) On the grid opposite, draw the graph of $C = 2F$ for values of F from –25 to 25

You may use the table to help you.

[2 marks]

F	–25		
C	–50		

Plot (-25 , -50) and work out what C is when F is 25. Plot that point as well then connect those two points to complete the graph

16 (c) Use your graph to estimate the value of T.

Give your answer in degrees Celsius.

[2 marks]

Answer _____ degrees Celsius

T is the y-coordinate where both the lines meet as this is the only point which lies on both the line which converts the temperatures and the line which indicates the Celsius being double the Fahrenheit

Turn over for the next question

5

Turn over ▶

.CG Maths.

1 7

17 In a bag there are 10p coins, 20p coins and 50p coins.

There are two **fewer** 20p coins than 10p coins.

There are five **more** 50p coins than 10p coins.

17 (a) Complete the table.

[1 mark]

Coin	Number of coins
10p	n
20p	$n-2$
50p	

5 more than n

17 (b) Altogether, there are 60 coins.

Work out the total **value** of the 20p coins.

[4 marks]

Express the total number of coins in terms of n by adding the expressions for the numbers of coins together then setting it equal to 60 as altogether, there are 60 coins.

Collect the like terms and simplify then rearrange to find n. The number of 20p coins is n - 2 so subtract 2 from n to find the number.

Multiply the number of 20p coins by 20 to work out the value of the coins in pence. This needs to be converted into pounds. There is 100 pence in a pound

Answer £ _____

18 A force of 180 newtons (N) is applied to the surface of this triangle.

Not drawn accurately

10 cm

12 cm
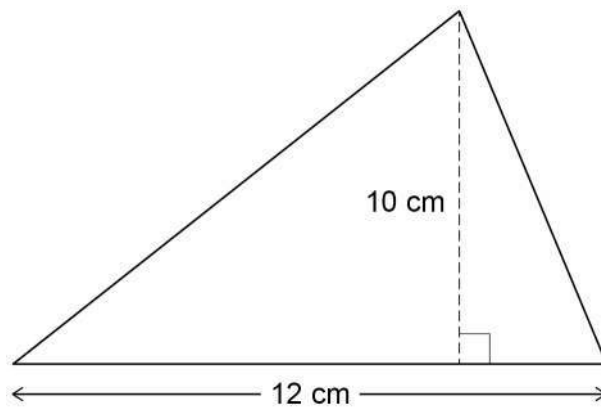
Work out the pressure.

Use   pressure = $\dfrac{\text{force}}{\text{area}}$

[3 marks]

Area of triangle = 1/2 x base x height
Substitute the force and area into the equation

Answer _____ N/cm^2

8

Turn over ▶

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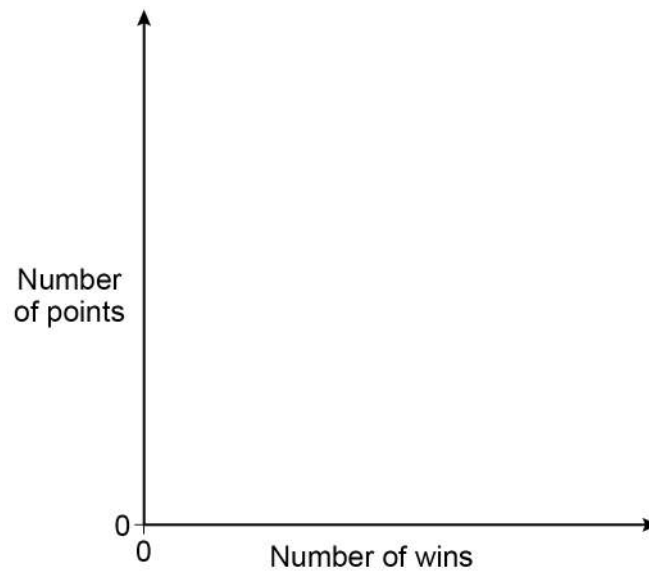**19** In a sport, the number of points is directly proportional to the number of wins.

On the axes, sketch a graph to show this relationship.

[1 mark]

Number of points

0

0

Number of wins

Any straight line with a positive gradient which goes through the origin (0 , 0)

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20 Using ruler and compasses, show the region inside the grid that is

less than 4 cm from *A*

and

nearer to *B* than to *C*.

Label the region R.

Show all your construction lines.

[3 marks]
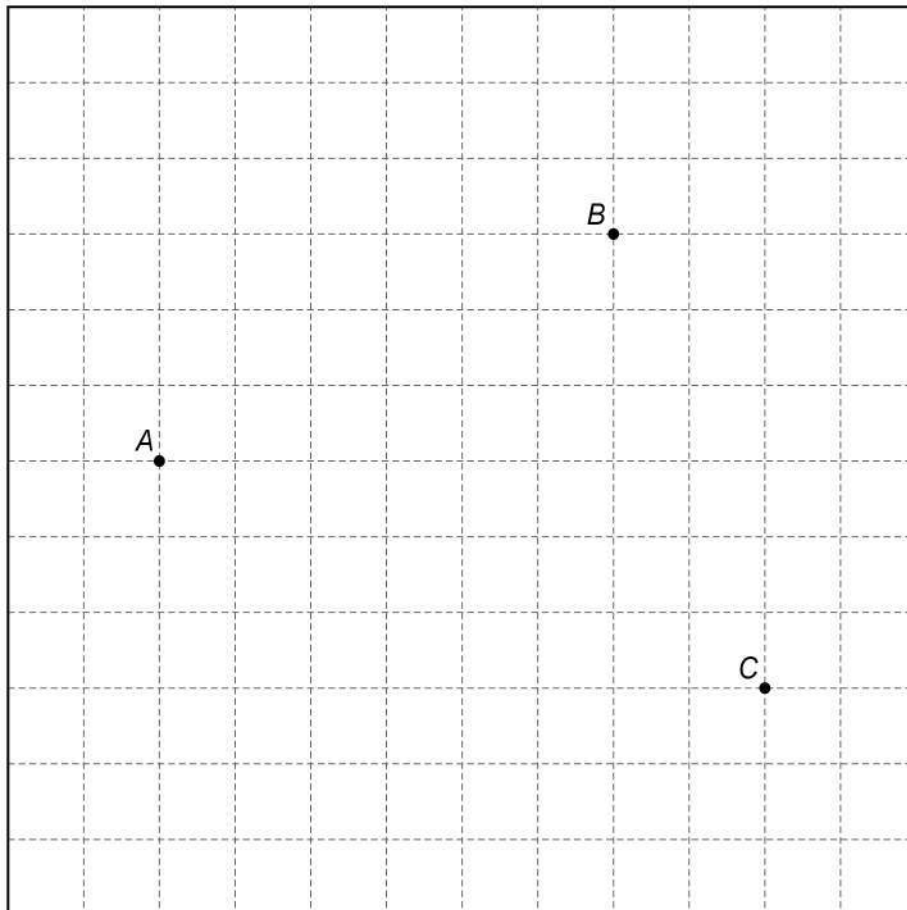
Set the compass with a radius of 4cm and scribe an arc around A to indicate all points which are 4cm from A. The region is within this arc.

Construct the perpendicular bisector of line BC to indicate all points which are an equal distance from B and C. Set the compass to a radius which is greater than half of the distance from B to C then scribe arcs from B and C. Draw a straight line through both of the points where the arcs meet. The region is on the side of the line which is closer to B

4

Turn over ▶

21 Beth drives 200 miles in 4 hours.

She drives the first 18 miles at an average speed of 36 mph
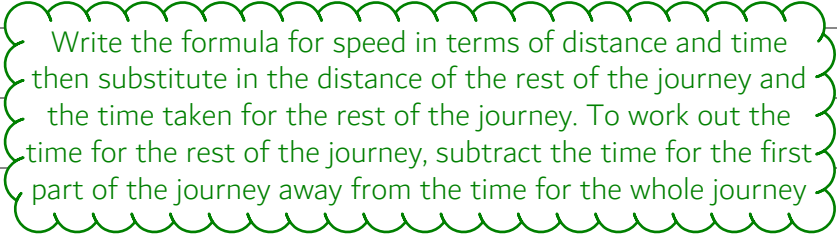
Work out her average speed for the rest of the journey.

[3 marks]

$s \overset{d}{} t$

This is the formula triangle for speed, distance and time

Write the formula for speed in terms of distance and time then substitute in the distance of the rest of the journey and the time taken for the rest of the journey. To work out the time for the rest of the journey, subtract the time for the first part of the journey away from the time for the whole journey
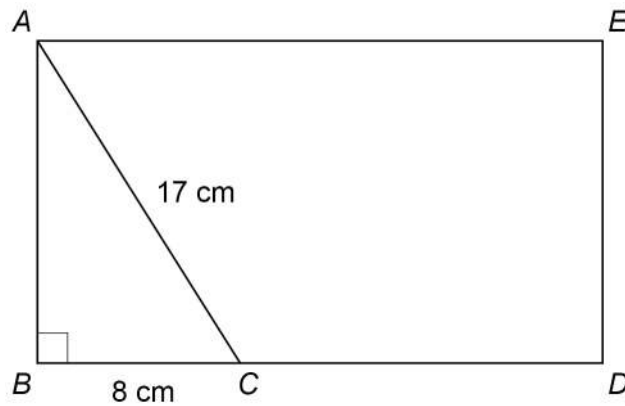
Answer _____ mph

22 The diagram shows rectangle *ABDE* and right-angled triangle *ABC*.

AC = 17 cm

BC = 8 cm

Not drawn accurately

BC : *CD* = 1 : 2

Work out the area of rectangle *ABDE*.

[4 marks]

$$a^2 + b^2 = c^2$$

Pythagoras' Theorem can be used to work out side AB as there are two sides in the right-angled triangle ABC. a and b are the shorter sides and c is the longest side

Area of rectangle = length x width
AB is the width and BD is the length. BD is represented by the total number of parts in the ratio and BC is represented by 1 part

Answer _____ cm^2

7

Turn over ▶

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23 In a sport, injury time is added time played at the end of a match.

The table shows the injury time, t (minutes) played in 380 matches.

Injury time, t (minutes)	Frequency
$0 < t \leqslant 2$	59
$2 < t \leqslant 4$	158
$4 < t \leqslant 6$	106
$6 < t \leqslant 8$	45
$8 < t \leqslant 10$	12

23 (a) Circle the **two** words that describe the data.

[1 mark]

continuous   discrete   grouped   ungrouped

It is either continuous or discrete and grouped or ungrouped. It can't be continuous and discrete at the same time and can't be grouped and ungrouped at the same time. Continuous means it could be any value. Discrete means it can only be certain values (such as whole numbers)

23 (b) Which class interval contains the median?

You **must** show your working.

[2 marks]

Use the formula (n + 1)/2, where n is the number of data points, to work out which value is the median. Write down the cumulative frequency (the frequencies added up as they go). As soon as the cumulative frequency is above the number of the value which is the median, that category is the median

Answer _____ $< t \leqslant$ _____

23 (c) What percentage of the matches had **more than** 6 minutes of injury time?

[2 marks]

Both the 6 < t ≤ 8 and 8 < t ≤ 10 are more than 6 minutes. Express the total of both of these categories as a fraction of the total number of games then convert the fraction into a percentage

Answer _____ %

24 x is an integer.

$$-4 < x \leqslant 2$$

and

$$2 \leqslant x + 3 < 9$$

Rearrange this inequality to get x by itself in the middle by getting rid of the +3 from the middle. Do the opposite operation to all sides to do this

Work out all the possible values of x.

[3 marks]

Integers are whole numbers. List all the integers which satisfy both inequalities at the same time

Answer _____

8

Turn over ▶

25 Joe and Kyle share an amount of money in the ratio $7 : n$

Joe gets 35% of the money.

Work out the value of n.

[2 marks]

Express the ratio of the percentage Joe gets to the percentage Kyle gets. Divide the percentage Kyle gets by the same amount as 35 has been divided by to get 7; this finds n

Answer _____

26 Circle the reciprocal of 4

[1 mark]

−4   2   0.4   0.25

Reciprocal means '1 divided by'

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27 $x : y = 1 : 3$

Circle the correct equation.

[1 mark]

$$y = 3x \qquad y = \frac{x}{3} \qquad y = x - 2 \qquad y = x + 2$$

x could be 1 and y could be 3. Substitute these values into each equation to see which ones don't work. Then substitute in another pair of values which follow the ratio to see which others don't work

28   A linear sequence starts

11   21   31   41   …

Work out an expression for the nth term of the sequence.

[2 marks]

The nth term should be written in the form ax + b, where a is the amount the sequence goes up between each term and b is the 0th term (the one before the first term)

Answer _____

END OF QUESTIONS

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