AQA

.CG Maths.
Hints

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE MATHEMATICS

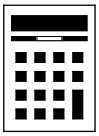
F

Foundation Tier Paper 3 Calculator

Monday 8 June 2020 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.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- 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	
TOTAL	

Please note that these worked solutions have neither been provided nor approved by AQA and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

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

.CG Maths.

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

Do not write outside the box

1 What is 6.2819 to 2 decimal places?

Circle your answer.

[1 mark]

6.2 6.28 6.29 6.3

The 8 is in the 2nd decimal place. The 1 after it causes it to round down so it stays the same and everything after it is ignored

2 50% of a number is 40

Circle the number.

[1 mark]

20 80 800 2000

50% is half. The opposite of doing half of a number is multiplying it by 2

3 Circle the correct statement.

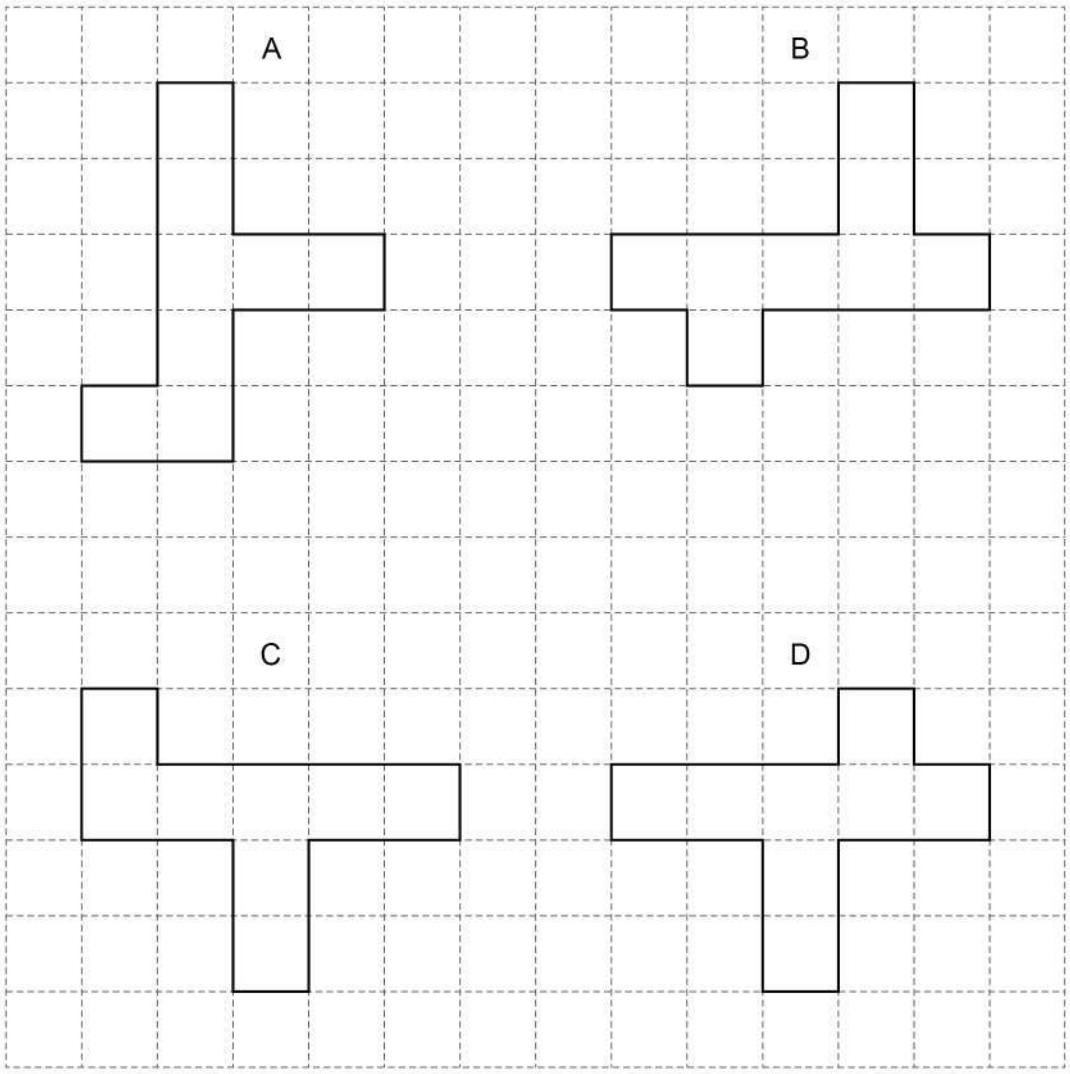
[1 mark]

$0.07 \geqslant 0.7$ $0.07 = 0.7$ $0.07 < 0.7$ $0.07 > 0.7$

0.07 is less than 0.7

Do not write outside the box

4 Shapes A, B, C and D are on a square grid.



Which two shapes are congruent?

Circle your answer.

[1 mark]

A and C B and A C and D D and B

Congruent means that the shapes are identical but they could be rotated or reflected

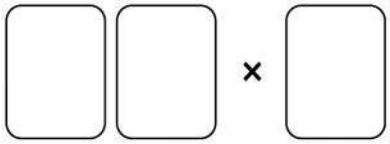
4

Do not write outside the box

5 Here are three number cards.

5 (a) Use all three cards to make the answer to this calculation a multiple of 10

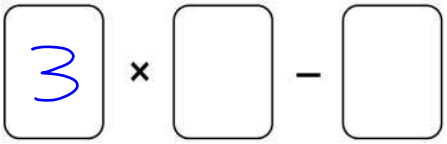
[1 mark]



A multiple of 5 multiplied by an even number gives a multiple of 10

5 (b) Use all three cards to make the answer to this calculation a single-digit number.

[1 mark]



The single-digit numbers are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

Do not write outside the box

5 (c) Use all three cards to make this a correct calculation.

[1 mark]

$$\frac{6 + \square}{\square + \square} = 1$$

In order to equal to 1, the numerator must have the same value as the denominator

6 Greg wants to buy a games console that costs £267.50

He already has £125

He will save £7.50 each week.

In how many weeks will he have saved enough?

[3 marks]

Subtracting what he already has from the cost leaves how much he still needs to pay. Dividing this by the amount he saves each week gives how many weeks he will need

Answer _____

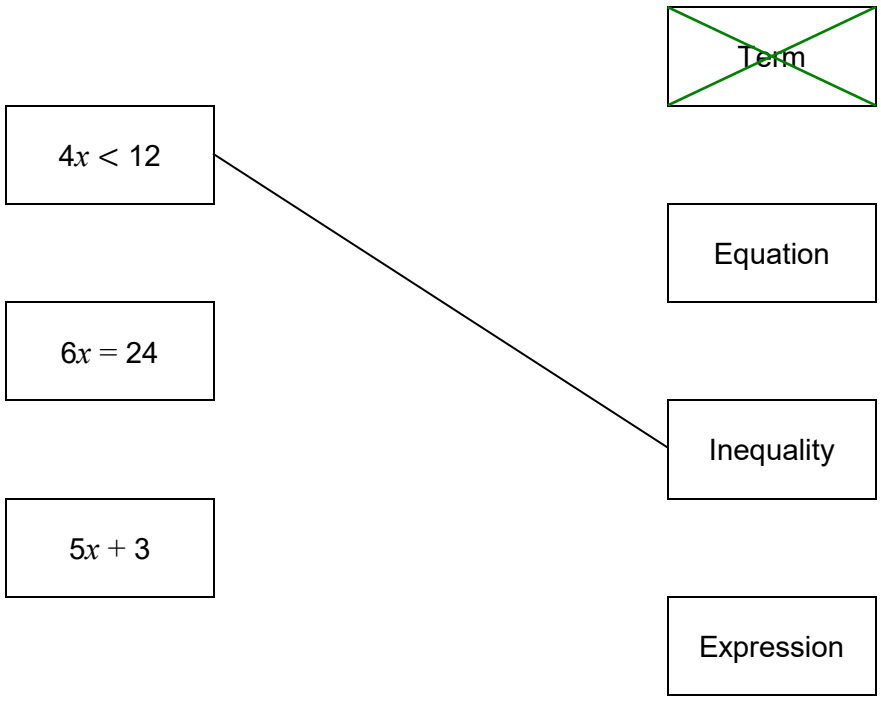
6

Do not write outside the box

7 Match the algebra to the correct description.

One has been done for you.

[2 marks]



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8 A team of two players is picked from these people.

Female	Amy (A) Laura (L)
Male	Erik (E) Rob (R) Tim (T)

The team **must** have one female player and one male player.

Complete this list to show **all** of the possible teams.

[2 marks]

Female player	Male player
A	E

Using systematic listing ensures all possibilities are listed

Turn over for the next question

4

Do not write outside the box

9 500 people started a race.

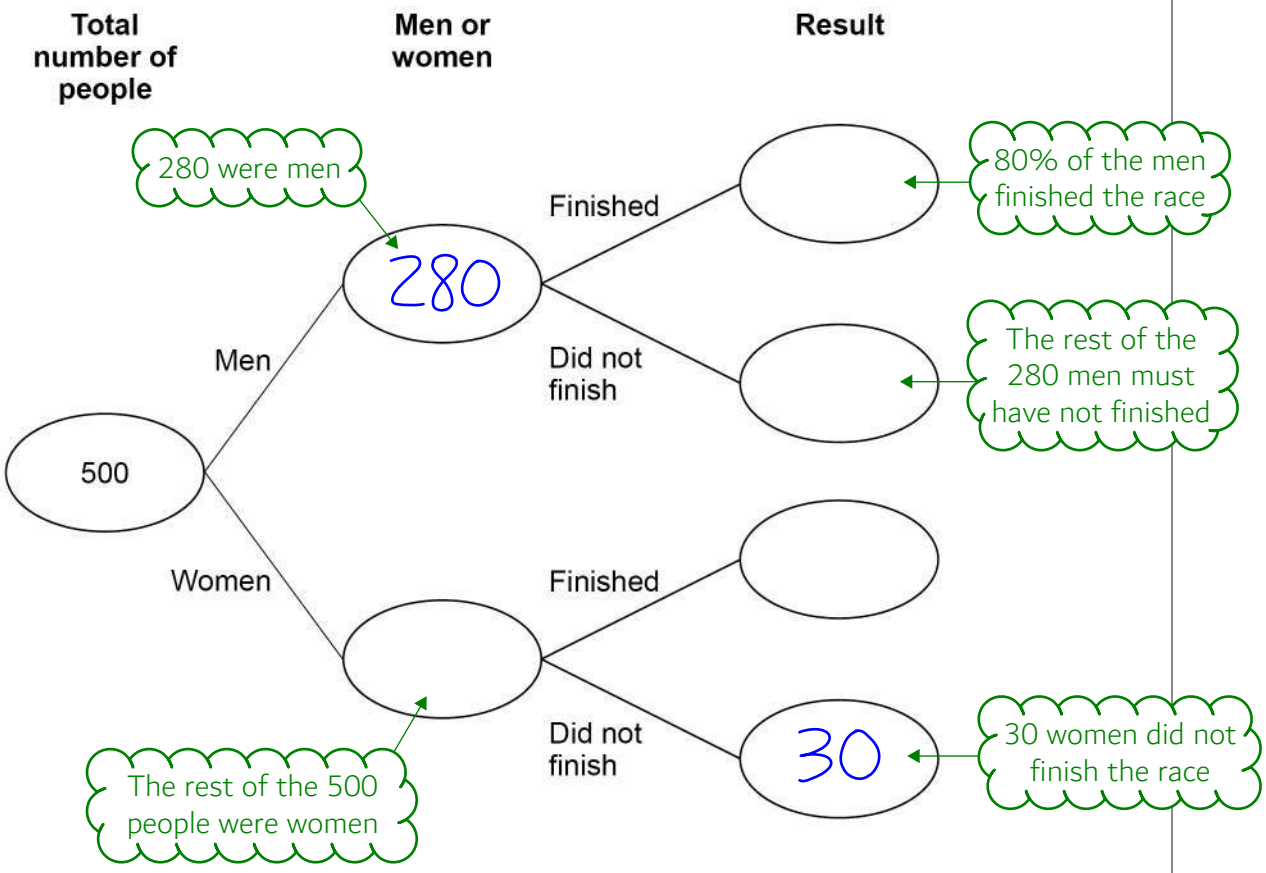
280 were men and the rest were women.

80% of the men finished the race.

30 women did **not** finish the race.

Complete the frequency tree.

[5 marks]



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10 Put these three distances in order of size.

1.8 kilometres 1600 metres $1\frac{3}{4}$ kilometres

Start with the shortest.

[2 marks]

Convert all the measurements into a decimal number of kilometres. There are 1000 metres in a kilometre

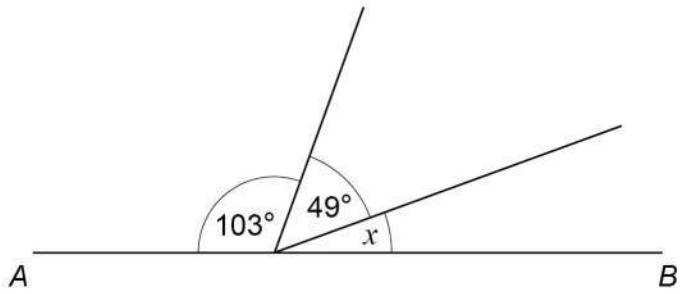
Entering the mixed fraction then pressing the SD button converts it to a decimal

Shortest distance _____

_____

Longest distance _____

11 *AB* is a straight line.



Not drawn accurately

Work out the size of angle x.

[2 marks]

There are 180° around a point on a straight line

Answer _____ degrees

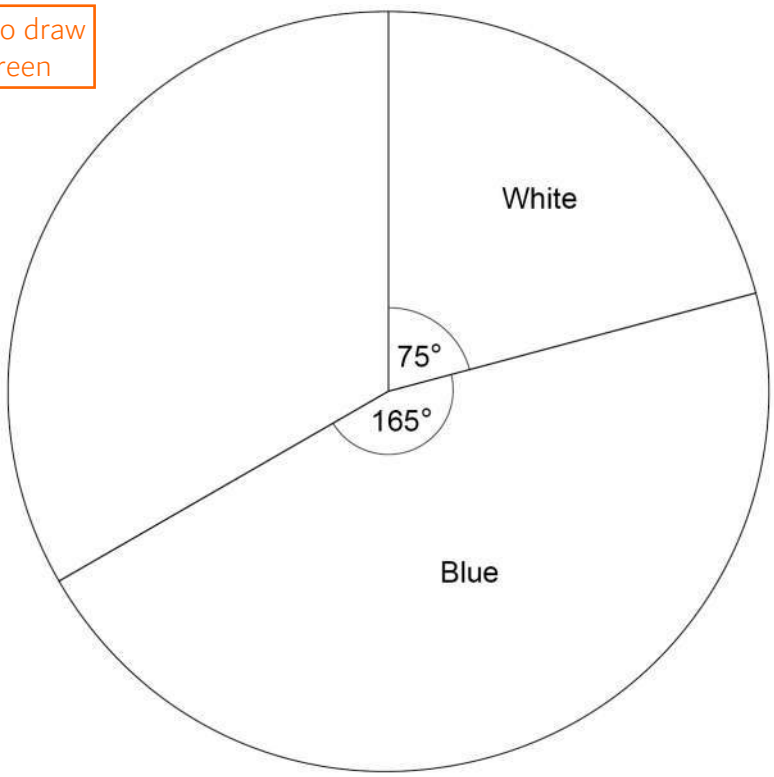
9

Do not write outside the box

12 Some players were asked the shirt colour of their football team.
Each answer was either White, Blue, Red or Green.

A pie chart is drawn to represent the answers.
Two of the sectors are shown.

Use a protractor to draw the angle for Green



12 (a) The number who answered Red is three times the number who answered Green.

Complete the pie chart.

[3 marks]

Let G be the angle for Green. Red must be 3G. Adding these two angles gives the remaining number of degrees, which is also found by subtracting the number of degrees used so far from 360. Using this we can create an equation in terms of G which can be solved to find the angle for Green. There is no need to work out the angle for Red as it will be the rest of the pie chart. Don't forget to label the sectors with their colour

Do not write outside the box

12 (b) There were 600 players altogether.

How many players answered White?

[2 marks]

There are 360° in total in a pie chart. Out of these, 75° are for White. So 75/360 of the 600 must have answered White

Answer _____

13 Milly has an equal number of 20p coins and 50p coins.

The value of her 20p coins is £2.80

Work out the **total** value of her 20p and 50p coins.

[3 marks]

Dividing the £2.80 by £0.20 works out how many 20p coins there are, and therefore how many 50p coins there are as there are an equal number of both. Multiplying this by £0.50 works out the value of the 50p coins. Adding this to the £2.80 gives the total value of the coins

Answer £ _____

8

Do not write outside the box

14 Here are ticket prices for a theme park.

Single tickets	
Adult £48	Child £26
Special offer tickets	
1 adult and 2 children	£82
2 adults and 2 children	£120

14 (a) Freya buys tickets for 3 adults and 4 children.

She pays the cheapest possible total cost.

How much does she save compared to buying all single tickets?

[4 marks]

She can buy one of the first special offer ticket and one of the second special offer ticket to buy the tickets as cheaply as possible. Subtracting both of these costs from the cost of buying all the tickets with single tickets works out the difference and therefore how much was saved

Answer £ _____

Do not write outside the box

14 (b) Leroy buys 5 single adult tickets.

He uses a voucher that reduces the price of tickets by a quarter.

In total, how much does he pay?

[3 marks]

Work out the normal cost of the 5 single adult tickets. 1 - 1/4 works out the fraction of the normal cost it goes down to. Multiplying by this works out this fraction of the price

Answer £ _____

15 n is negative.

Circle the expression that is **positive**.

[1 mark]

$n - 1$ n^2 n^3 $\frac{1}{n}$

A negative multiplied by a negative is a double negative so therefore becomes positive

Turn over for the next question

8

Do not write outside the box

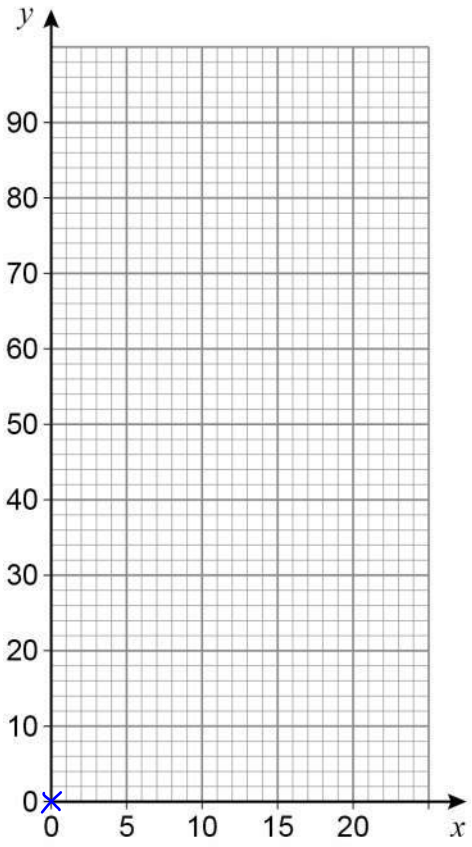
16 Here is a formula.

$$y = 3.6x$$

16 (a) Draw the graph of $y = 3.6x$ for values of x from 0 to 20

[2 marks]

3.6 x 0 = 0. So when x is 0, y is also 0. The coordinate of (0 , 0) is on the line. Work out the y coordinate when x is 20 and plot this point. It is a straight line as it is in the form y = mx + c



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In the formula $y = 3.6x$

y is speed in kilometres per hour (km/h)

x is speed in metres per second (m/s)

16 (b) Convert 50 km/h to m/s

Give your answer to the nearest whole number.

[1 mark]

Going across from 50 on the y axis to the line then down converts it to m/s

Answer _____ m/s

16 (c) Convert 30 m/s to miles per hour.

Use 1 mile per hour = 1.61 km/h

[3 marks]

Use the formula y = 3.6x to convert the m/s to km/h. Every 1.61km/h is 1mph so working out how many lots of 1.61 the km/h is therefore works out how many lots of 1mph it is

Answer _____ miles per hour

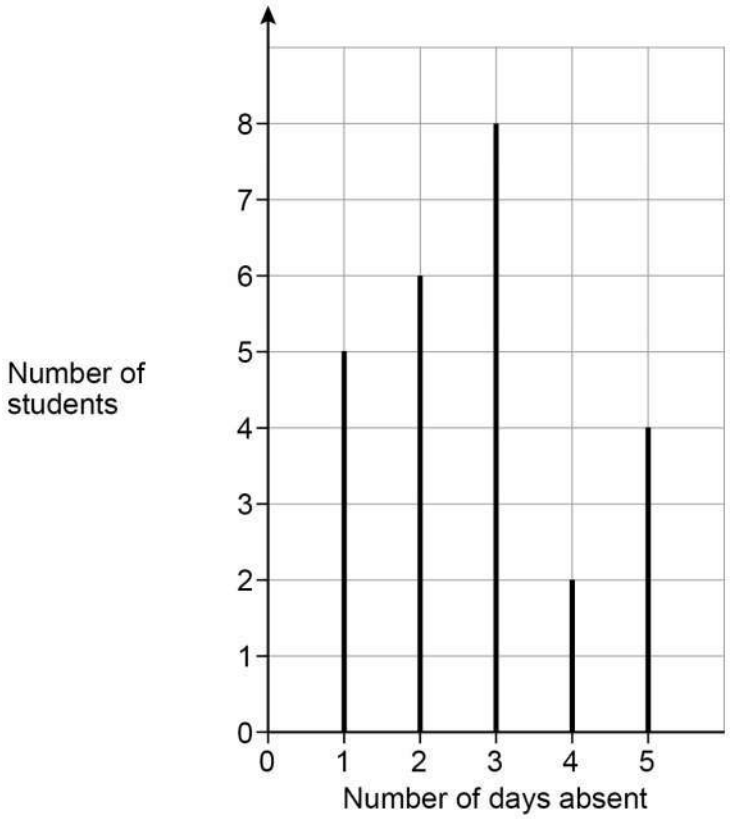
Turn over for the next question

6

Do not write outside the box

17 A record was kept of the number of days that 25 students were absent one term.

The chart represents the results.



17 (a) Work out the mean number of days absent.

[3 marks]

Mean = total/number. Total is the total number of days absent for all of the students combined. Number is the number of students. Multiplying the number of days absent by the number of students for each bar then adding together all the results gives the total number of days absent for all of the students

Answer _____

Do not write outside the box

17 (b) One of the students is chosen at random.

Work out the probability that the student was absent for **less than** 4 days.

[2 marks]

The bars representing 1, 2 and 3 days are less than 4 days. Adding together the number of students these represent gives the number of students who were absent for less than 4 days. Express this number as a fraction of the total number of students: this is the probability

Answer _____

18 Bobbi has these notes.

Note	Number of notes
£5	3
£10	x

The total value of her notes is £T

Write a formula for T in terms of x.

[2 marks]

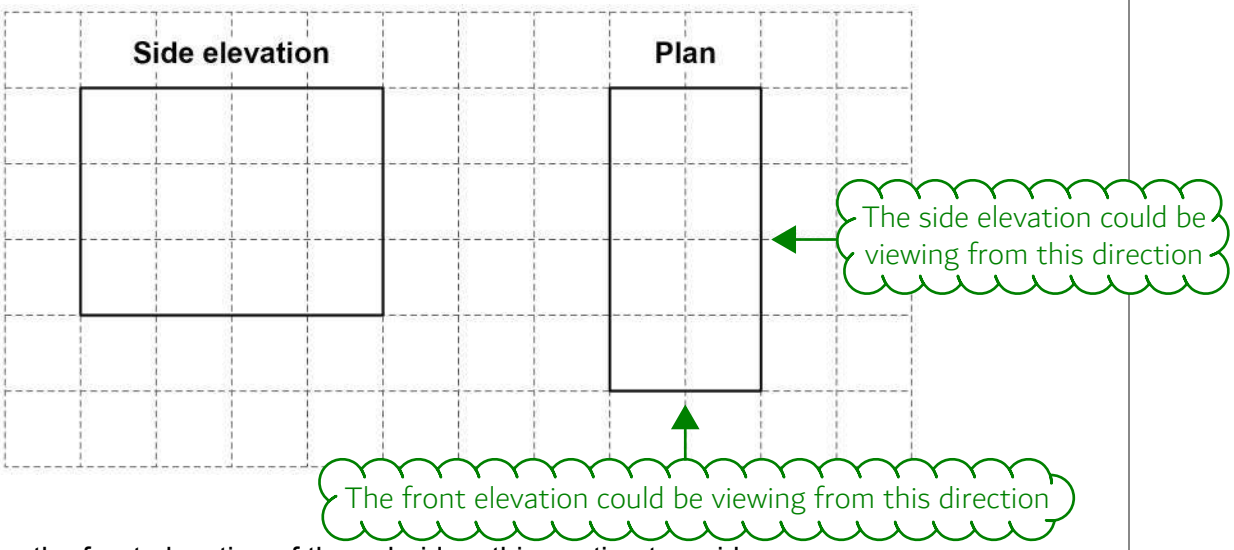
There are 3 £5 notes and 3 x 5 = 15 so these are worth £15. The total value of her notes is £15 plus £10 times the number of £10 notes, which is x

Answer $T =$

7

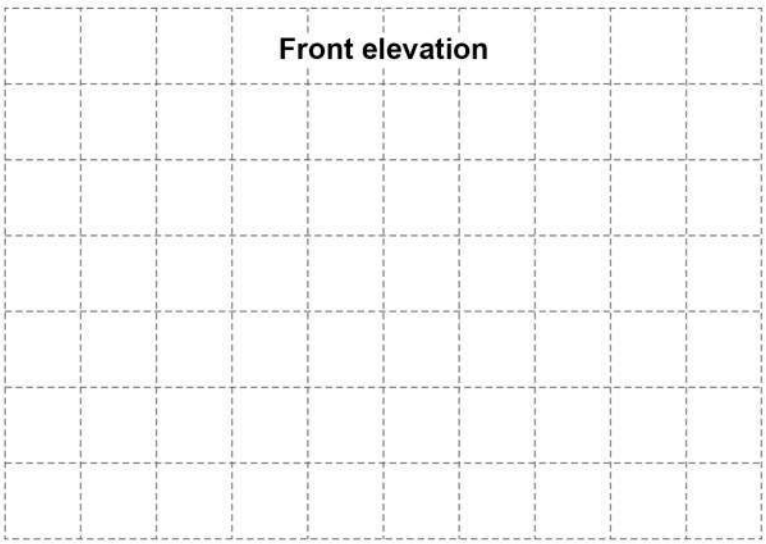
Do not write outside the box

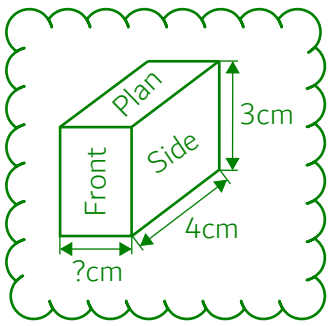
19 The side elevation and plan of a cuboid are shown on the centimetre grid.



Draw the front elevation of the cuboid on this centimetre grid.

[2 marks]





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20 To the nearest 1000, there are 18 000 people at a festival.

20 (a) Write down the minimum possible number of people at the festival.

[1 mark]

Answer _____

The resolution is 1000. Halving this and subtracting it from the 18000 gives the lower bound, which is the minimum possible number of people

20 (b) Write down the maximum possible number of people at the festival.

[1 mark]

Answer _____

The resolution is 1000. Halving this and adding it from the 18000 gives the upper bound. However this rounds up to 19000 so it needs to be 1 fewer than this

21 Circle the equation of the line parallel to $y = 5x + 2$

[1 mark]

$y = 2x + 5$ $y = 5x - 2$ $y = -5x + 2$ $y = -2x - 5$

Each equation is in the form y = mx + c, where m is the gradient and c is the y intercept. Parallel lines have the same gradient

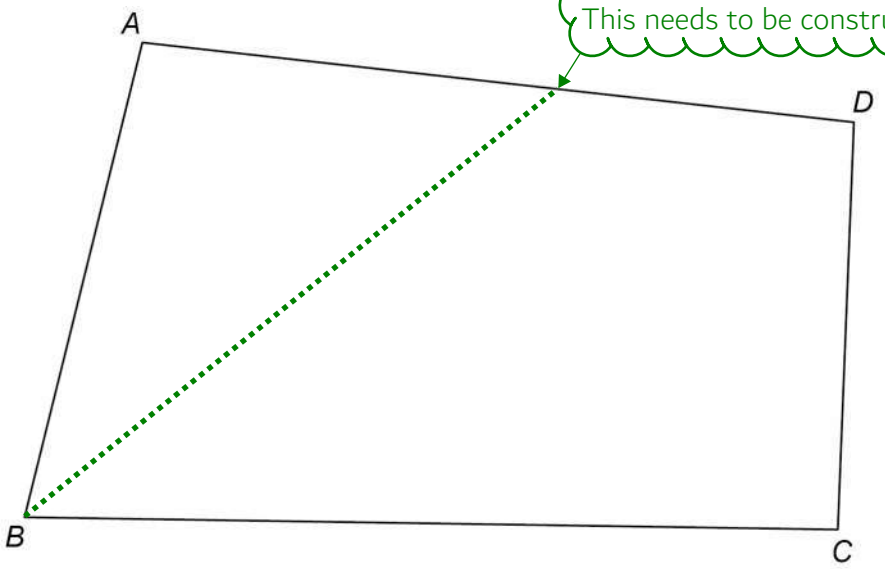
Turn over for the next question

5

Do not write outside the box

22 *ABCD* represents the plan of a field.

The path will be the line which bisects the angle ABC. This needs to be constructed



There is a path across the field that

starts at *B*

is the same distance from *BA* and *BC*.

Using ruler and compasses, show the position of the path.

[2 marks]

Scribe two arcs of equal radius from B which cut AB and BC. Then draw arcs from both of these using the same radius which meet with a cross. Then draw a straight line from B through this cross

23 a is two times b.

Circle the ratio $a : b$

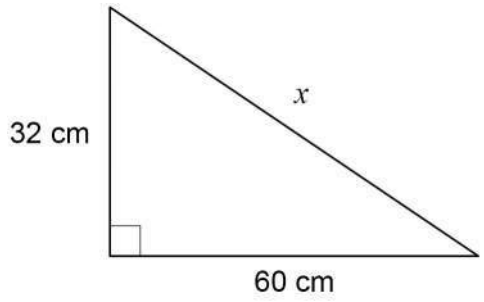
[1 mark]

1 : 3 3 : 1 1 : 2 2 : 1

The number of parts for a needs to be twice as many as for b

Do not write outside the box

24 Use Pythagoras' theorem to work out the value of x.



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[3 marks]

$a^2+b^2=c^2$ ← Pythagoras' Theorem where a and b are the shorter sides and c is the longest side

Answer _____ cm

Turn over for the next question

6

Do not write outside the box

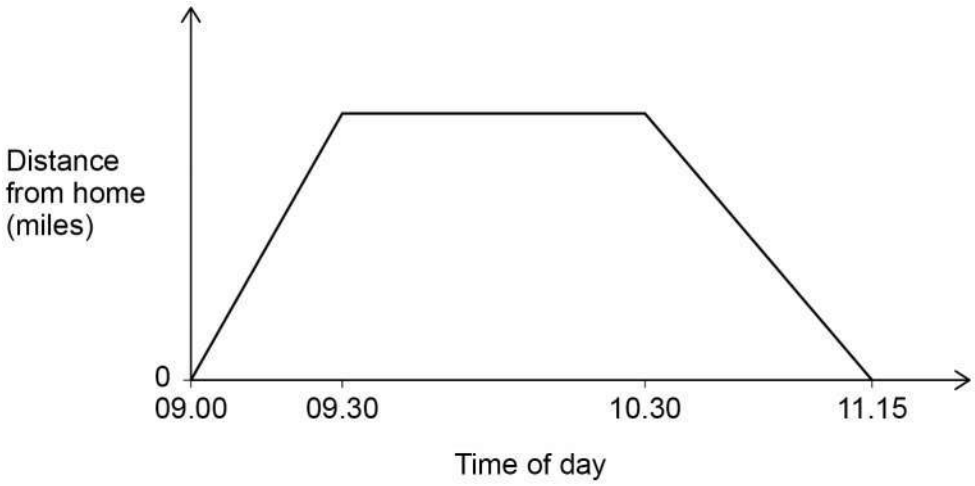
25 Chris visits a library.

He cycles to the library in half an hour at a speed of 12 miles per hour.

He stays at the library for one hour.

He then cycles home.

The sketch graph represents his visit.



Work out the speed, in miles per hour, at which Chris cycles home.

[3 marks]

s d t

Writing the formula triangle for speed, distance and time

The distance on the way back is the same as the distance on the way there. Work out the distance on the way there then use this and the time on the way back to work out the speed on the way back

Answer _____ mph

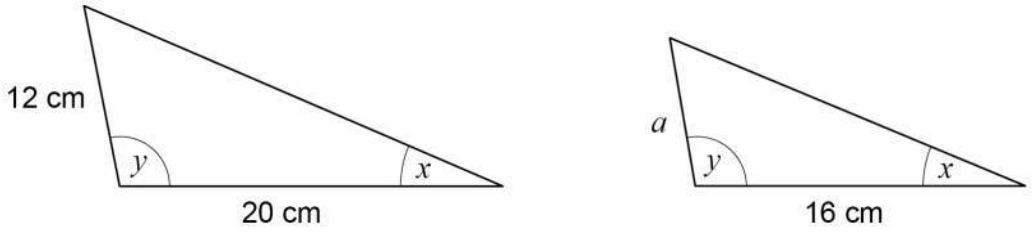
FACT 8 o , ,,

To enter time in the calculator: enter the hours, press the button on the left, enter the minutes, press the button on the left. 9:30 will appear as 9°30°

Do not write outside the box

26 These two triangles are similar.

Not drawn accurately



Work out the value of a.

[2 marks]

Work out the fraction the smaller triangle is of the larger triangle. Then work out this fraction of the 12

Answer _____ cm

27 Circle the expression that is equivalent to $(x-1)^2$

[1 mark]

x^2-1 x^2+1 x^2-2x-1 x^2-2x+1

To expand a square bracket: square the first term, double the product of the two terms, square the last term

Turn over for the next question

6

Do not write outside the box

28 Here is some information about 26 houses.

a, b and c are all **different** numbers.

Number of bedrooms	Number of houses
1	7
2	a
3	b
4	c
5	8

The median number of bedrooms is 3.5

Work out a possible set of values for a, b and c.

[3 marks]

$\frac{26+1}{2} = 13.5$

Using the formula (n + 1)/2, where n is the number of houses, tells us that the median is halfway between the 13th value, which must be 3, and 14th value, which must be 4, in order for the median to be 3.5

13 houses are after the median and 13 houses are before

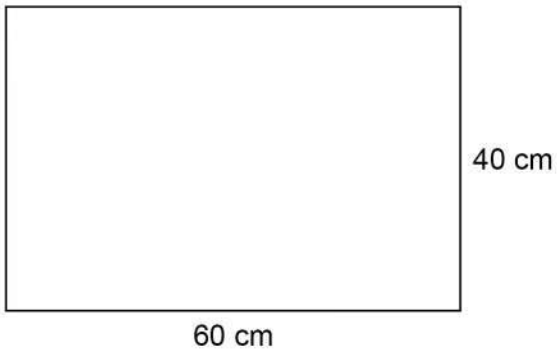
$a =$ _____

$b =$ _____

$c =$ _____

Do not write outside the box

29 A rectangle has length 60 cm and width 40 cm



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The length decreases by 15%

The width decreases by 10%

Sue says,

"The perimeter decreases by 25% because 15% + 10% is 25%"

Is she correct?

You **must** show calculations to support your answer.

[4 marks]

Perimeter is all of the outside sides added together. Find the original perimeter and decrease it by 25%. Decrease the 60cm by 15% and the 40cm by 10% then work out the new perimeter. Compare the two values to decide if Sue is correct. To decrease by x%, multiply the value by (100 - x)/100

7

Do not write outside the box

30 Expand and simplify fully $4(2c + 3) - (5c - 1)$

[2 marks]

Answer _____

31 $\mathbf{c} = \begin{pmatrix} 4 \\ 9 \end{pmatrix}$ $\mathbf{d} = \begin{pmatrix} 2 \\ -5 \end{pmatrix}$

Work out $4\mathbf{c} + 3\mathbf{d}$

[2 marks]

Deal with the x components and y components separately. Column vectors are in the form $\binom{x}{y}$. $a\binom{x}{y} = \binom{ax}{ay}$

Answer ( )

END OF QUESTIONS

4