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

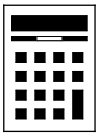
F

Foundation Tier Paper 2 Calculator

Thursday 4 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	
26–27	
28	
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

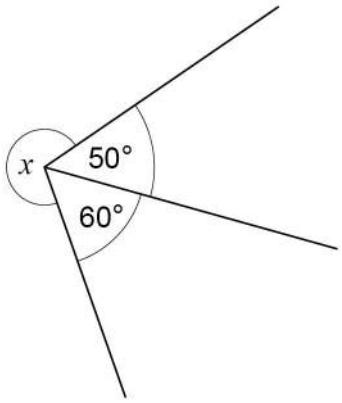
1 Circle the ratio that is the same as 3 : 4

[1 mark]

6 : 7 6 : 8 6 : 9 6 : 16

One of the ratios simplifies to 3 : 4. To make an equivalent ratio, divide or multiply both sides by the same amount

2



Not drawn accurately

Circle the size of angle x.

[1 mark]

70° 110° 250° 270°

There are 360° in total around a point

3 Circle the expression that has the **smallest** value when $x = 4$

[1 mark]

$5 - x$ $\frac{1}{2}x$ $x + 1$ $x - 4$

Substitute x for 4 in each expression to work out their values

Do not write outside the box

4 The term-to-term rule for a sequence is

add 1 then double

The first two terms are 2 and 6

Circle the next term.

[1 mark]

9 13 14 18

Add 1 to 6 then double the result

5 (a) Solve $7x = 56$

[1 mark]

Dividing both sides by 7 makes x the subject

$x =$ _____

5 (b) Solve $25 - y = 18$

[1 mark]

What needs to be subtracted from 25 to get 18?

$y =$ _____

6

Do not write outside the box

6 Eleven people play a game.

Here are their scores.

12 9 15 9 18 18 3 14 9 16 20

6 (a) Write down the mode.

The mode is the most frequent number

[1 mark]

Answer _____

6 (b) Work out the median.

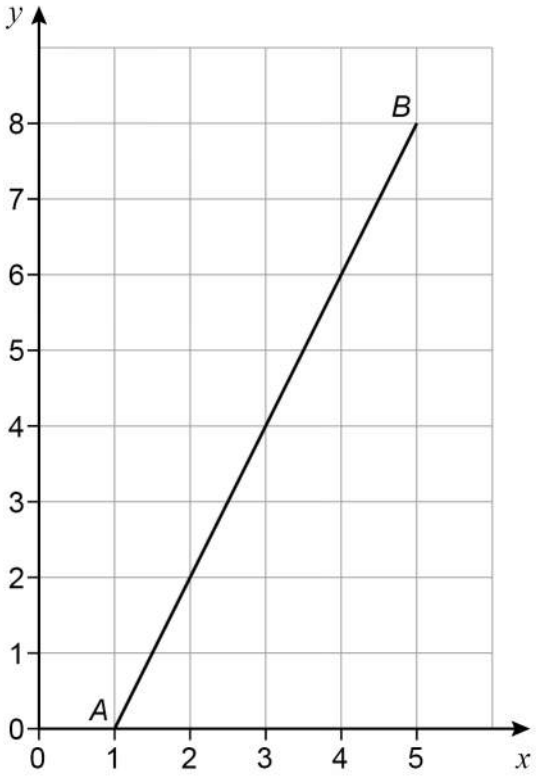
[2 marks]

Using the formula (n + 1)/2 where n is the number of pieces of data tells us which value is the median. Go through the numbers in order until we reach this value

Answer _____

Do not write outside the box

7 Line AB is shown where A is the point (1, 0) and B is the point (5, 8)



7 (a) P is a point on AB.

The distance AP is half the distance AB.

P is halfway between A and B

Work out the coordinates of P.

[1 mark]

x coordinate

y coordinate

Answer (_____ , _____)

7 (b) A line is drawn from B that is

parallel to the x-axis

meets the y-axis at point Q.

We need to draw a horizontal line from point B to the y axis. Where it meets is point Q

Work out the coordinates of Q.

[1 mark]

Answer (_____ , _____)

5

Do not write outside the box

8 (a) Write down an even whole number that is also a square number.

[1 mark]

Answer _____

A square number is the result of squaring a whole number. An even number is divisible by 2

8 (b) Write down **all** the cube numbers between 100 and 400

[2 marks]

Press MENU then 3 to go into table mode. $f(x) = x^3$. Start: 1. End: 30. Step 1. This lists out all of the cube numbers up to 30^3

Answer _____

8 (c) Write down **two** numbers that

are multiples of 3

and

multiply to make 216

[1 mark]

Try dividing 216 by multiples of 3 until we get a multiple of 3 as the answer. The answer multiplied by the multiple of 3 used will give 216. We can check if a number is a multiple of 3 by dividing it by 3 to see if we get a whole number

Answer _____ and _____

Do not write outside the box

9 Members of a club are Senior, Adult or Junior.

9 (a) Here is a report about the members of the club.

18% are Senior
54% are Adult
38% are Junior

Give a reason why there **must** be a mistake in the report.

[1 mark]

Try adding up the percentages

9 (b) An Adult membership fee is £120

A Junior membership fee is $\frac{1}{5}$ of the Adult fee.

Work out the **total** membership fee for 2 Adults and 3 Juniors.

[3 marks]

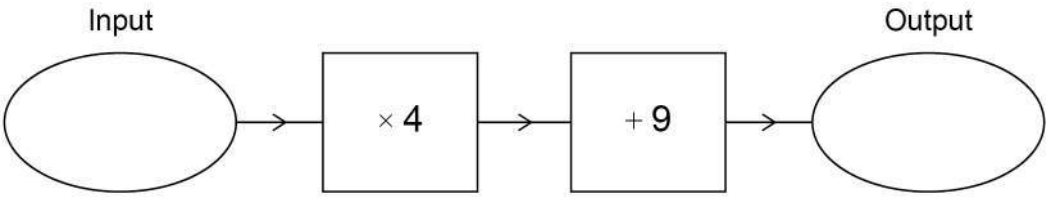
Adding the membership fee for 2 Adults to the membership fee for 3 Juniors works out the total membership fee. To work out the fee for a Junior, do 1/5 of 120. 'Of' means to multiply

Answer £ _____

8

Do not write outside the box

10 (a) Here is a number machine.



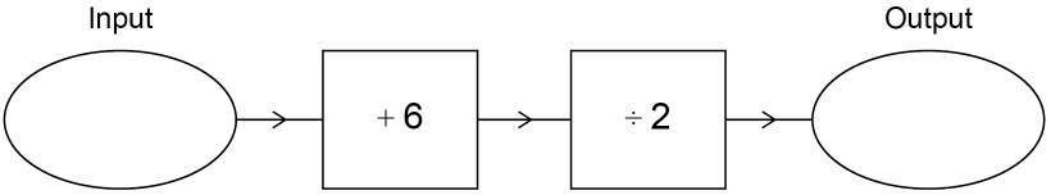
Work out the output when the input is 16

[1 mark]

Multiply 16 by 4. Then add 9 to the result

Answer _____

10 (b) Here is a different number machine.



Work out the output when the input is –48

[1 mark]

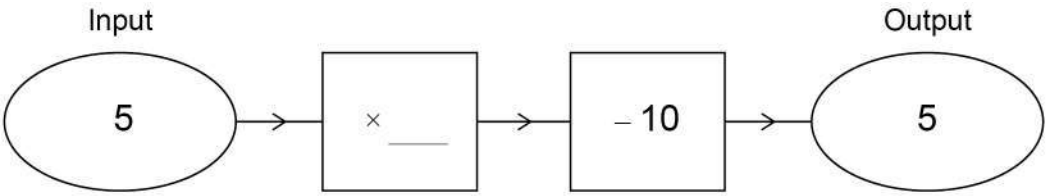
Add 6 to -48. Then divide the result by 2

Answer _____

Do not write outside the box

10 (c) Complete this number machine.

[1 mark]



Use the number machine backward by starting with the output of 5 and do the opposite of subtracting 10. Then go forward from the input of 5 to work out what it must be multiplied by to get the result

11 Here are two calculations.

A	**B**
$17^2 - 300$	$47 \times 21 - 10^3$

Which calculation has the smaller answer?

You **must** show the answer to each calculation.

[2 marks]

Type the calculations for A and B into the calculator exactly how they are above

Both answers should be negative. The smallest is the most negative

Answer _____

5

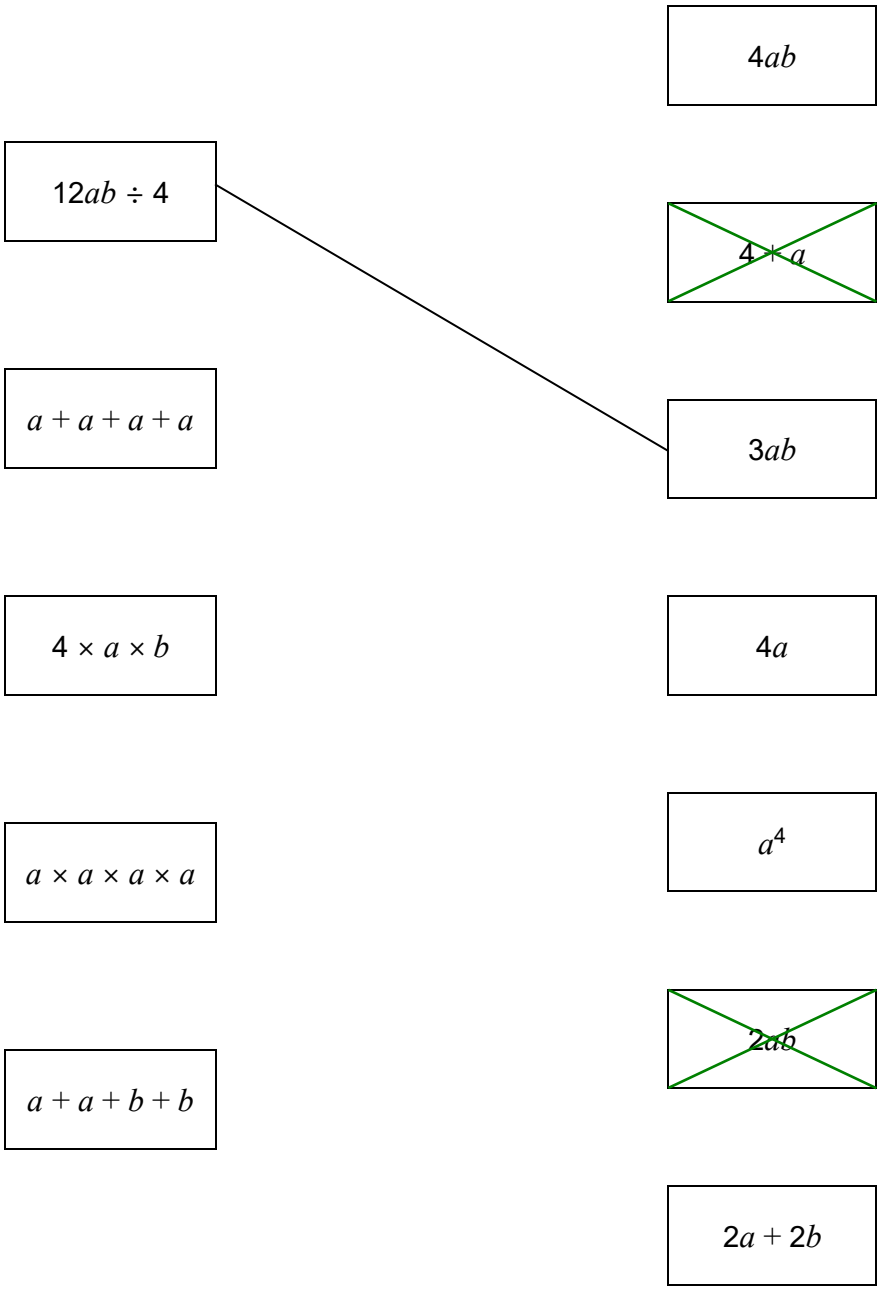
Turn over ►

Do not write outside the box

12 Match each expression on the left with one on the right.

One has been done for you.

[4 marks]



Do not write outside the box

13 Jenny works for 30 hours and is paid £318

Calvin works for 28 hours and is paid £287

Jenny is paid more per hour than Calvin.

How much more?

[3 marks]

Dividing the amount paid by the number of hours worked gives the pay per hour.
Subtracting Calvin's hourly pay from Jenny's hourly pay works out the difference

Answer _____ pence

Turn over for the next question

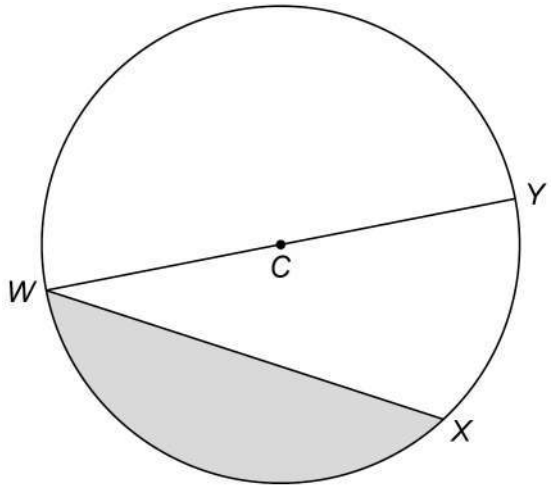
7

Do not write outside the box

14 This circle has centre C.

W, X and Y are points on the circle.

WY is a straight line.



Tick **one** box for each statement.

[3 marks]

	True	False
WY is a diameter.	☐	☐
WX is a radius.	☐	☐
The shaded section is a sector.	☐	☐
Arc XY is part of the circumference.	☐	☐

A diameter is a straight line which connects two points on the circumference of the circle and goes through the centre. A radius is a straight line which connects the centre of the circle to a point on the circumference of the circle. A sector is an area enclosed by two radii and the circumference. The circumference is the outside of the circle

Do not write outside the box

15 Mortar is made by mixing cement and sand as shown.

For every 1 kg of cement used, add 4 kg of sand

Cement costs £0.19 per kg

Sand costs £0.07 per kg

Tomasz uses 150 kg of cement to make some mortar.

Work out the total cost of the mortar.

[3 marks]

150×0.19

The cost of the cement

There are 150 lots of 1kg of cement therefore there are 150 lots of 4kg of sand. Adding the cost of the cement and the cost of the sand gives the total cost of the mortar

Answer £ _____

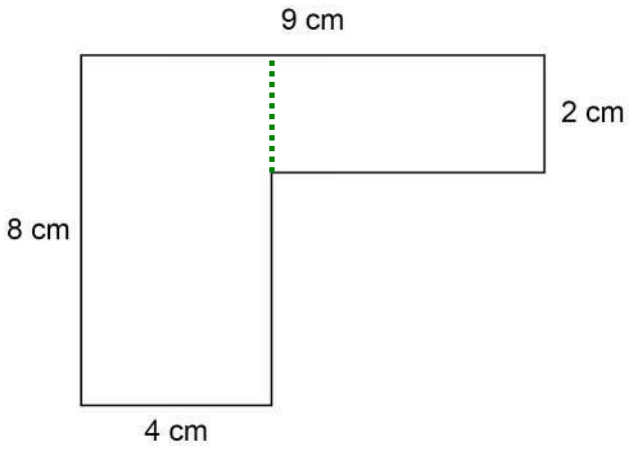
Turn over for the next question

6

Do not write outside the box

16 (a) Here is a shape made from rectangles.

Not drawn accurately



Work out the area.

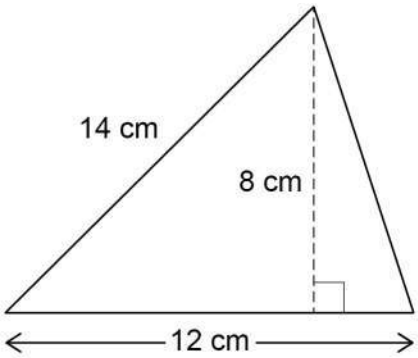
[3 marks]

Area of rectangle = length x width

Answer _____ cm^2

Do not write outside the box

16 (b) Zak wants to work out the area of this triangle.



Not drawn accurately

Here is his working.

$12 \times 8 = 96 \text{ cm}^2$

What is wrong with his method?

[1 mark]

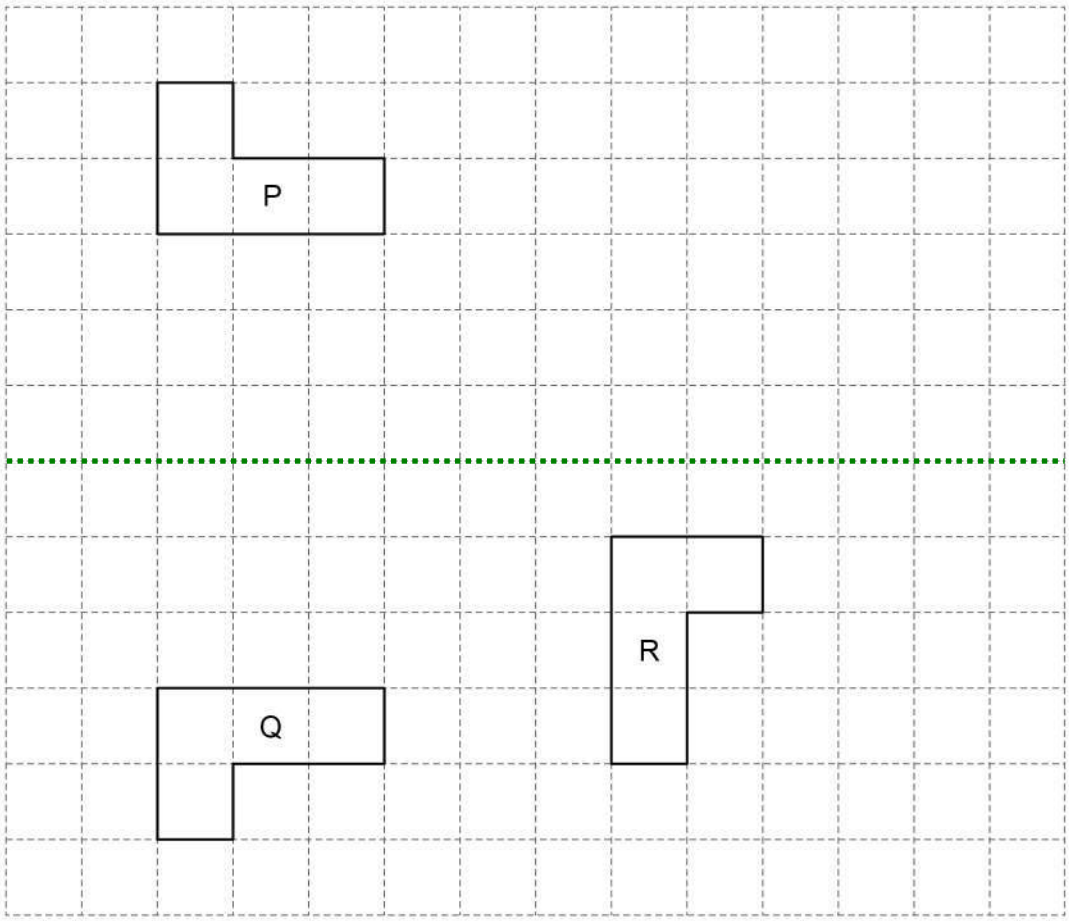
Area of triangle = 1/2 x base x height

Turn over for the next question

4

Do not write outside the box

17 Here are shapes P, Q and R.



17 (a) P is mapped to Q by a single transformation.

Circle the type of transformation.

[1 mark]

rotation reflection translation enlargement

P has flipped onto the other side of the straight line

17 (b) P is mapped to R by a single transformation.

Circle the type of transformation.

[1 mark]

rotation reflection translation enlargement

P has turned

Do not write outside the box

18 Kim buys pet food in 1.5 kg packs.

Her pet needs 0.8 kg of food each week.

She wants to have enough food for the next 14 weeks.

She already has two 1.5 kg packs.

Work out the smallest number of packs she needs to buy.

You **must** show your working.

[4 marks]

Work out what mass of food she wants by considering that 0.8kg is needed each week for 14 weeks. Subtract what she already has from this to work out how much she needs to buy. Work out how many lots of 1.5kg goes into what she needs to buy and therefore how many packs are needed. Packs cannot be bought in decimal amounts

Answer _____

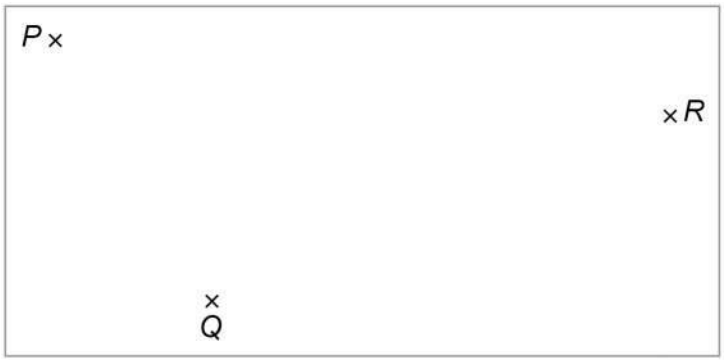
Turn over for the next question

6

Do not write outside the box

19 A scale drawing shows the positions of P, Q and R.

Not drawn accurately



On the scale drawing

$PQ = 4$ cm $\quad$ $QR = 6.5$ cm

The actual distance PQ is 50 metres less than the actual distance QR.

Work out the scale.

[3 marks]

Work out how many centimetres the distance PQ is less than the distance QR on the scale drawing. The actual distance of 50m is represented by this. Divide to work out what 1cm represents

Answer $\quad$ 1 cm represents _____ metres

Do not write outside the box

20 (a) a and b are whole numbers.

$a \leqslant 12$ $b < 9$

Work out the **largest** possible value of $2a + b$

[2 marks]

We need both a and b to be as large as possible. a must be less than or equal to 12. b is less than 9

Answer _____

20 (b) x and y are both **negative** numbers.

Show that $\frac{y}{x}$ could equal 4

[1 mark]

A negative divided by a negative gives a positive as it is a double negative. So we can basically consider what two positive numbers divided give 4 and make them both negative

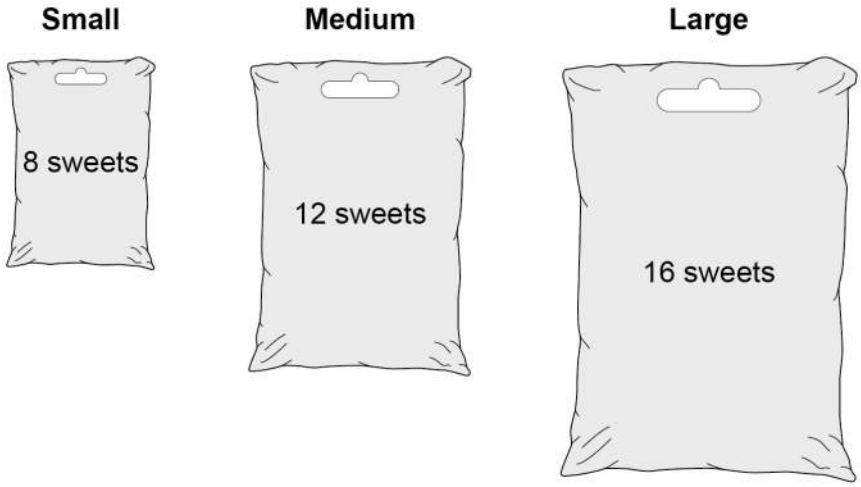
Try your y/x in the calculator to check it gives 4

Turn over for the next question

6

Do not write outside the box

21 Jill puts 440 sweets into small bags, medium bags and large bags.



She uses

30 small bags

twice as many medium bags as large bags.

There are no sweets left over.

For the number of bags, work out the ratio small : medium : large

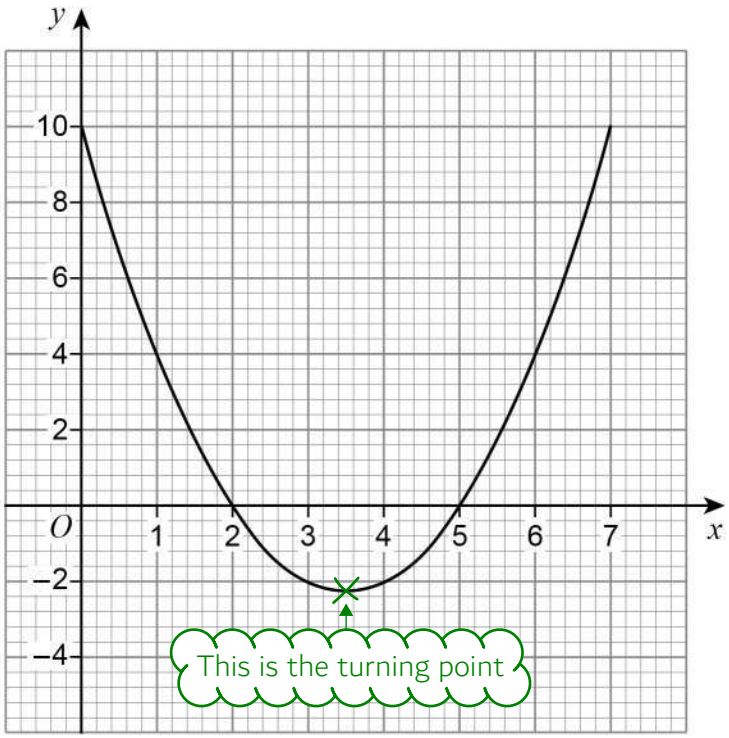
[4 marks]

Work out the number of sweets in the small bags by considering there are 30 small bags and 8 sweets in each one. Let L be the number of large bags. There must be 2L medium bags as there are twice as many medium bags as large bags. Express the number of sweets in the medium and large bags. Adding together the number of sweets in small bags and the expressions for the number in the medium and large bags must equal to the total number of sweets. This forms an equation in terms of L which can be solved. Once we have the number of large bags, this can be doubled to get the number of medium bags. The numbers of bags can now be written as a ratio, which does not need to be simplified

Answer _____ : _____ : _____

Do not write outside the box

22 Here is the graph of $y = x^2 - 7x + 10$ for values of x from 0 to 7



22 (a) Write down the roots of $x^2 - 7x + 10 = 0$

[2 marks]

Answer _____

The roots are the values of x where y = 0

22 (b) Write down the x-coordinate of the turning point of the curve.

[1 mark]

_____

Answer _____

7

Do not write outside the box

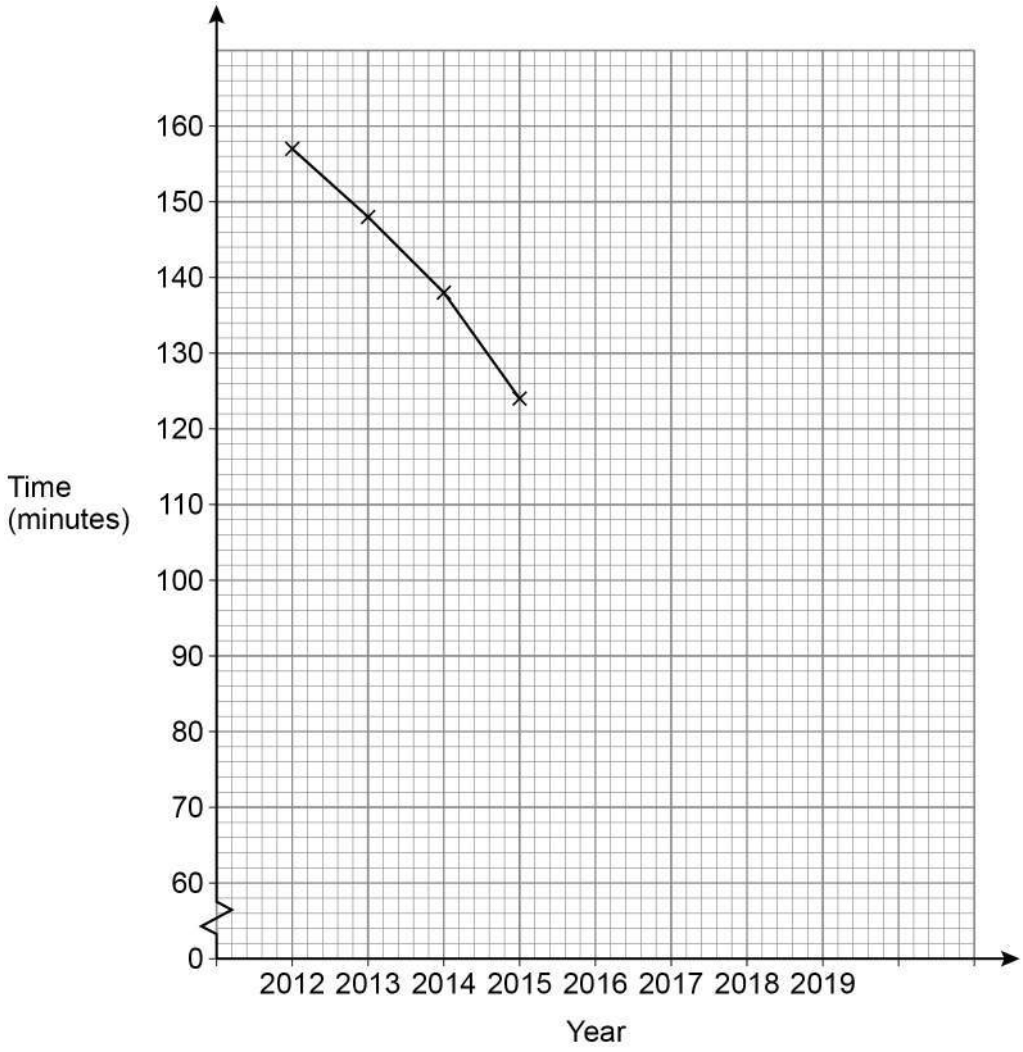
23 The time students spent watching TV was recorded.

The table shows the average daily time per student each year from 2012 to 2019

Year	2012	2013	2014	2015	2016	2017	2018	2019
Time (minutes)	157	148	138	124	113	100	90	82

A time series graph is drawn to represent the data.

The first four points have been plotted.



The scale increases by 10 over 5 boxes. 10/5 = 2 so each box is worth 2. Half a box is worth 1

Do not write outside the box

23 (a) Complete the graph.

[2 marks]

23 (b) Use the graph to estimate the average daily time per student in 2020

[1 mark]

Extend the line with a similar gradient to the rest of the line to make an estimate for 2020

Answer _____ minutes

24 Work out the highest common factor (HCF) of 75 and 105

[2 marks]

Express both numbers as a product of prime factors. The highest common factor is the lowest power of each prime factor multiplied together. If there are none of a prime in one of the expressions, the power is 0 and it doesn't need to be included

To get a number as a product of prime factors, enter the number, press = then SHIFT then FACT, which is the button on the right

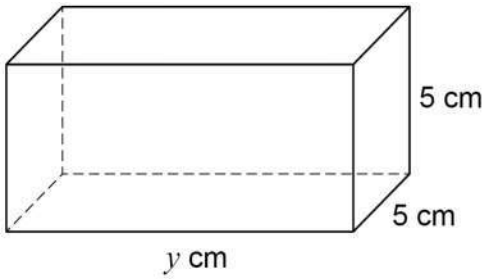
Answer _____

Turn over for the next question

5

Do not write outside the box

25 Here is a cuboid.



25 (a) Assume that the total surface area of the cuboid is 200 cm^2

Work out the volume of the cuboid.

[3 marks]

Volume of cuboid = length x width x height
Area of rectangle = length x width
Opposite faces on a cuboid are the same. Adding together the area of all of the faces on the cuboid gives the surface area. This creates an equation in terms of y which can be rearranged and solved to find y

Answer _____ cm^3

Do not write outside the box

25 (b) In fact, the total surface area of the cuboid is smaller than 200 cm^2

What does this mean about the volume of the cuboid?

Tick **one** box.

[1 mark]

- ☐ It is smaller than the answer to part (a)
- ☐ It is bigger than the answer to part (a)
- ☐ It is the same as the answer to part (a)
- ☐ It could be any of the above

Both the width and height are still 5cm so y must be smaller

26 Here is some information about the time spent on social media by 50 people.

Time, t minutes	Number of people
$0 < t \leqslant 15$	2
$15 < t \leqslant 30$	9
$30 < t \leqslant 45$	31
$45 < t \leqslant 60$	8

Both of these categories are over 30 minutes

Circle the number of people who spent more than 30 minutes.

[1 mark]

9 11 31 39

5

Do not write outside the box

27 At a party there are 90 people.

48 are women and 42 are men.

Some women leave.

Some men arrive.

The ratio of women to men is now 10 : 11

Are there now more than 90 people at the party?

Tick **one** box.

☐ Yes ☐ No ☐ Cannot tell

Show working to support your answer.

[2 marks]

Adding together the greatest possible number of women and greatest possible number of men gives the greatest possible total number of people now at the party. The number of women must be a multiple of 10 as the ratio is in its simplest form and there are 10 parts for women. Work out how many men there must be by using the ratio when there are the greatest number of women

Do not write outside the box

28 Alex and Bev sat six tests, each with 50 marks.

The table shows their mean percentages after five tests.

Alex	60%
Bev	52%

After all six tests, their mean percentages were equal.

In the sixth test, Alex scored 24 out of 50

Work out Bev's score, out of 50, in the sixth test.

[4 marks]

The mean percentages were equal therefore they must have had the same total scores. Subtracting Bev's total score after the first five tests from Alex's total score after all six tests leaves Bev's score in the sixth test. The mean percentage of the 50 marks works out the mean score per test. Mean = total/number, so total = mean x number. Multiplying the mean score by the number of tests will give the total score

Answer _____ out of 50

Turn over for the next question

6

Do not write outside the box

29 A solid piece of silver has

mass 2.625 kilograms

volume 250 cm^3

Work out the density of the piece of silver.

Give your answer in grams per cubic centimetre.

[2 marks]

The units tell us that the mass in grams needs to be divided by the volume in cm^3. There are 1000 grams in a kilogram

Answer _____ g/cm^3

30 Work out the gradient of the straight line through (–2, 3) and (1, 9)

[2 marks]

Gradient = (change in y)/(change in x)

Answer _____

END OF QUESTIONS

4