

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

I declare this is my own work.

GCSE MATHEMATICS

F

Foundation Tier Paper 2 Calculator

Thursday 4 June 2020

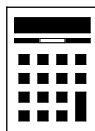
Morning

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

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

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

[1 mark]

6 : 7

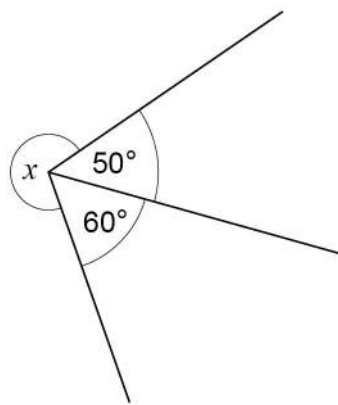
6 : 8

6 : 9

6 : 16

Dividing both sides of 6 : 8 by 2 gives 3 : 4

2

Not drawn
accuratelyCircle the size of angle x .

[1 mark]

70°

110°

250°

270°

There are 360° in total around a point

$$360 - 50 - 60 = 250$$

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

[1 mark]

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

$$\begin{aligned} 5 - 4 &= 1 \\ \frac{1}{2} \times 4 &= 2 \\ 4 + 1 &= 5 \\ 4 - 4 &= 0 \end{aligned}$$

Substituting x for 4 in each expression to work out their values. 0 is the smallest

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

$$\begin{aligned} 6 + 1 &= 7 \\ 7 \times 2 &= 14 \end{aligned}$$

5 (a) Solve $7x = 56$

[1 mark]

$$56/7 = 8$$

Dividing both sides by 7 makes x the subject

x =

8

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

[1 mark]

7 needs to be subtracted from 25 to get 18

y =

7



- 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.

[1 mark]

Answer _____ 9 _____

There is one 12, three 9s, one 15, two 18s, one 3, one 14, one 16 and one 20. So 9 is the most frequent number

- 6 (b)** Work out the median.

[2 marks]

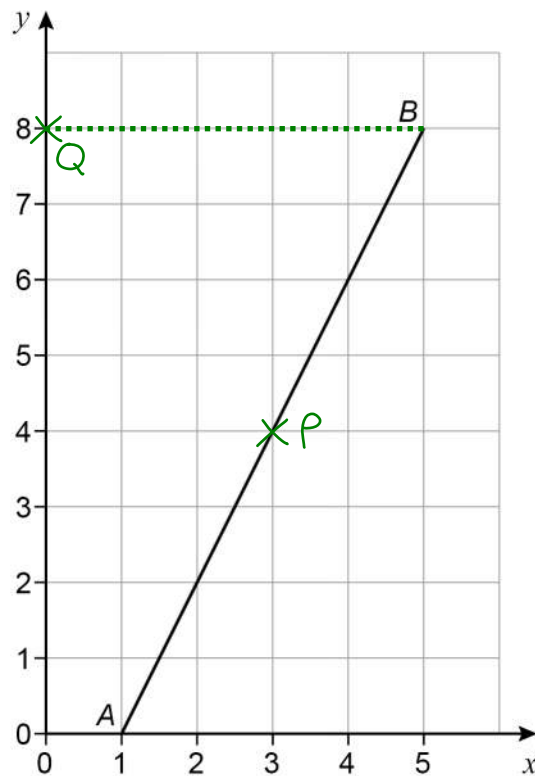
$$\frac{11+2}{2} = 6$$

Answer _____ 14 _____

Using the formula $(n + 1)/2$ where n is the number of pieces of data tells us that the 6th value is the median. Going through the numbers in order until we reach the 6th value: 3, 9, 9, 9, 12, 14



- 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 .
Work out the coordinates of P .

[1 mark]

Answer (3 , 4)

P is halfway between A and B

- 7 (b) A line is drawn from B that is
parallel to the x -axis
meets the y -axis at point Q .
Work out the coordinates of Q .

[1 mark]

Answer (0 , 8)



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

[1 mark]

Answer _____ 4 _____

- 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 _____ 125, 216, 343 _____

- 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. 3 is the first multiple of 3. $216/3 = 72$
so $72 \times 3 = 216$. $72/3 = 24$ so 72 is a multiple of 3

Answer _____ 3 _____ and _____ 72 _____



- 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]

There is more than 100%

Percentage is out of 100
and $18 + 54 + 38 = 110$

- 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]

$$2 \times 120 + 3 \times \frac{1}{5} \times 120$$

Membership fee
for 2 Adults

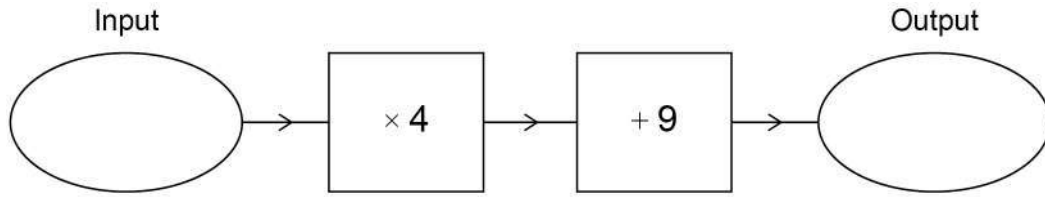
Membership fee for 3
Juniors. $\frac{1}{5} \times 120$ works
out $\frac{1}{5}$ of the Adult fee

Adding the membership fee for 2 Adults
to the membership fee for 3 Juniors
works out the total membership fee

Answer £ 312



10 (a) Here is a number machine.



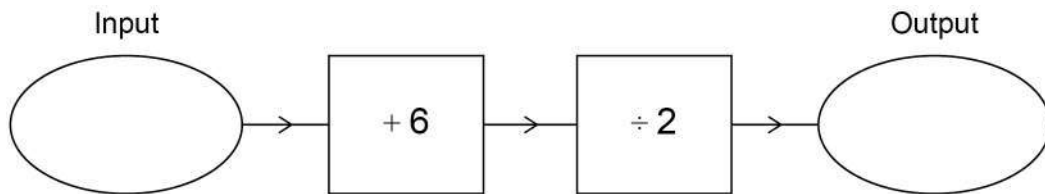
Work out the output when the input is 16

$$\begin{aligned} 16 \times 4 &= 64 \\ 64 + 9 &= 73 \end{aligned}$$

[1 mark]

Answer 73

10 (b) Here is a different number machine.



Work out the output when the input is -48

$$\begin{aligned} -48 + 6 &= -42 \\ -42 \div 2 &= -21 \end{aligned}$$

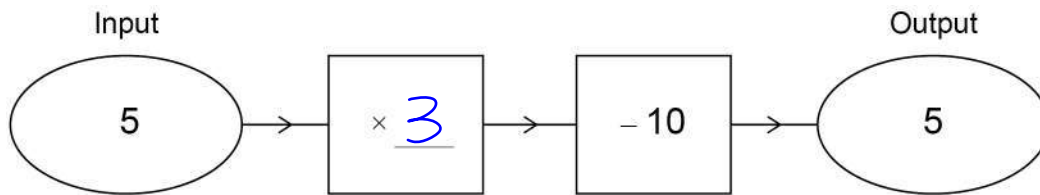
[1 mark]

Answer -21



10 (c) Complete this number machine.

[1 mark]



Using the number machine backward: $5 + 10 = 15$. Then going forward: 5 must be multiplied by 3 to get 15

11 Here are two calculations.

A
 $17^2 - 300$

-11

B
 $47 \times 21 - 10^3$

-13

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

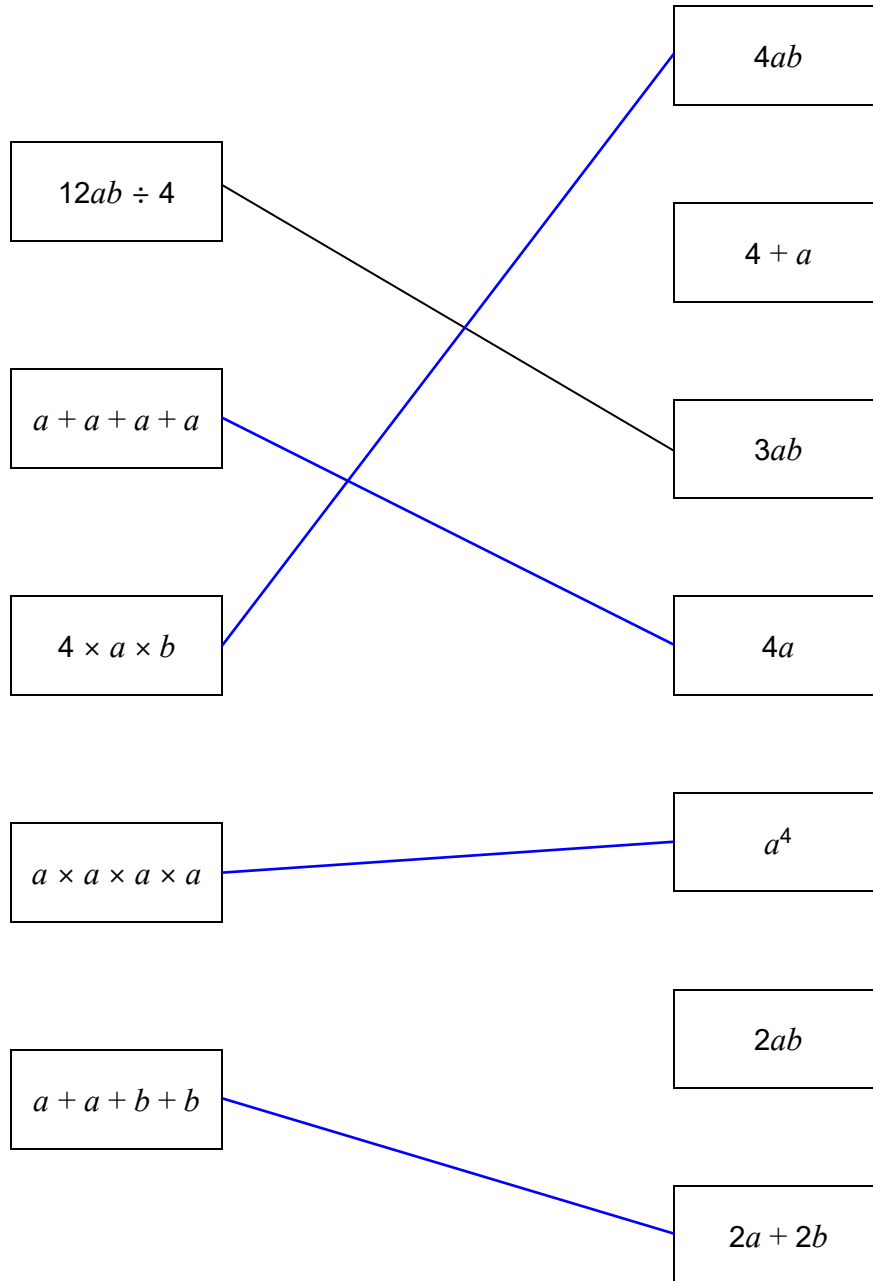
B is more negative so is a smaller answer

Answer

B



- 12** Match each expression on the left with one on the right.
One has been done for you.

[4 marks]

- 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]

$$\frac{318}{30} - \frac{287}{28}$$

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

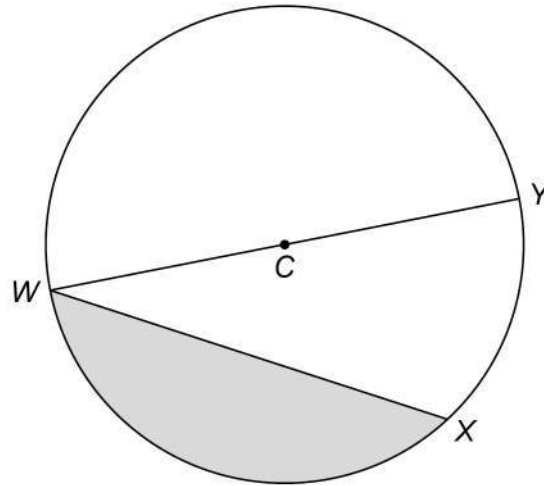
Answer 35 pence

Turn over for the next question

Turn over ►



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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
WX is a radius.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	← It is a chord
The shaded section is a sector.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	← It is a segment
Arc XY is part of the circumference.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	



- 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]

$$150 \times 0.19 + 4 \times 150 \times 0.07$$

Adding the cost of the cement and the cost of the sand gives the total cost of the mortar

The cost of
the cement

The cost of
the sand

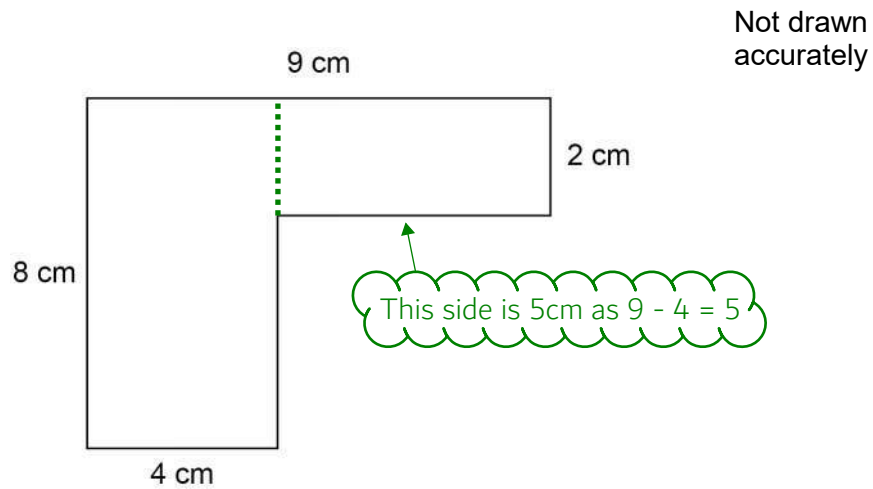
Answer £ 70.50

Turn over for the next question

Turn over ►



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



Work out the area.

[3 marks]

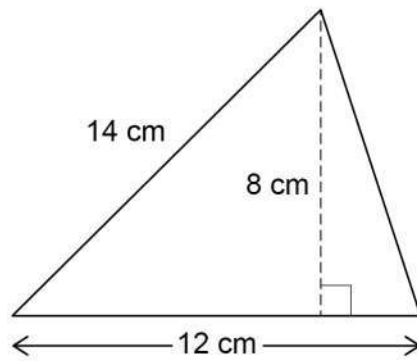
$$8 \times 4 + 5 \times 2$$

Area of rectangle = length \times width. Adding the areas of the two rectangles gives the area of the shape

Answer 42 cm²



- 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]

Didn't half

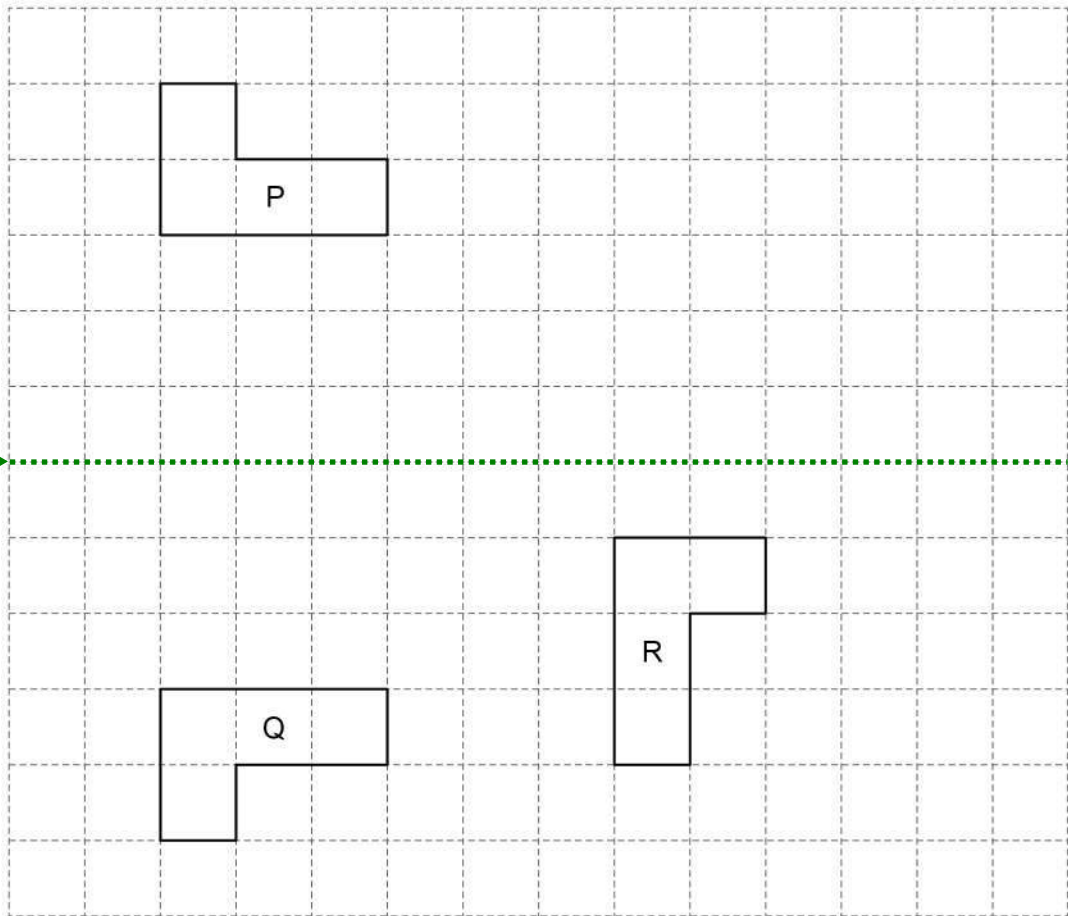
Area of triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

Turn over for the next question

Turn over ►



17 Here are shapes P, Q and R.



Q is a reflection
of P on this line

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

Circle the type of transformation.

[1 mark]

rotation

reflection

translation

enlargement

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



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]

$$\frac{14 \times 0.8 - 2 \times 1.5}{1.5} = 5.4\dot{6}$$

14 x 0.8 works out what mass of food she wants. Subtracting 2 x 1.5 works out what mass she needs to buy as it takes away what she already has from what she wants. Dividing this by 1.5 works out how many lots of 1.5kg goes into what she needs to buy and therefore works out how many packs are needed, which must be rounded up to the next whole number as packs cannot be bought in decimal amounts

Answer _____ 6 _____

Turn over for the next question

6

Turn over ►



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



Not drawn
accurately

On the scale drawing

$$PQ = 4 \text{ cm} \quad QR = 6.5 \text{ cm}$$

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

Work out the scale.

[3 marks]

$$\frac{50}{6.5 - 4}$$

6.5 - 4 works 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 so dividing by this works out what 1cm represents

Answer 1 cm represents 20 metres



20 (a) a and b are whole numbers.

$$a \leq 12 \quad b < 9$$

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

[2 marks]

$$2 \times 12 + 8$$

We need both a and b to be as large as possible. a can be 12 and b can be 8

Answer 32

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

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

[1 mark]

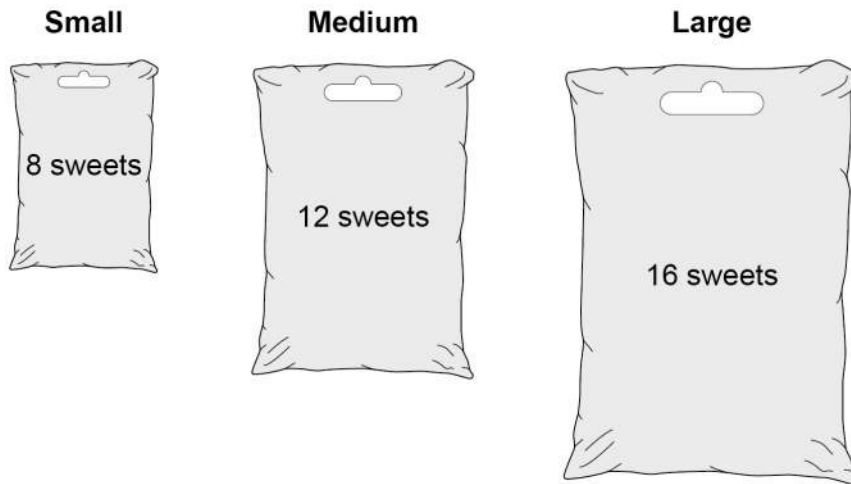
$$\frac{-4}{-1} = 4$$

Turn over for the next question



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]

Let L be the number of large bags

$$30 \times 8 + 2L \times 12 + L \times 16 = 440$$

The number of sweets in small bags

The number of sweets in large bags

Adding the number of sweets in the small, medium and large bags must give the total number of sweets

The number of sweets in medium bags.
There are twice as many medium bags than large bags so the number of medium bags can be expressed as $2L$

$$L = \frac{440 - 30 \times 8}{2 \times 12 + 16}$$

Subtracting 30×8 from both sides leaves the L terms on their own. Then dividing both sides by the number of L

$$M = 2 \times 5$$

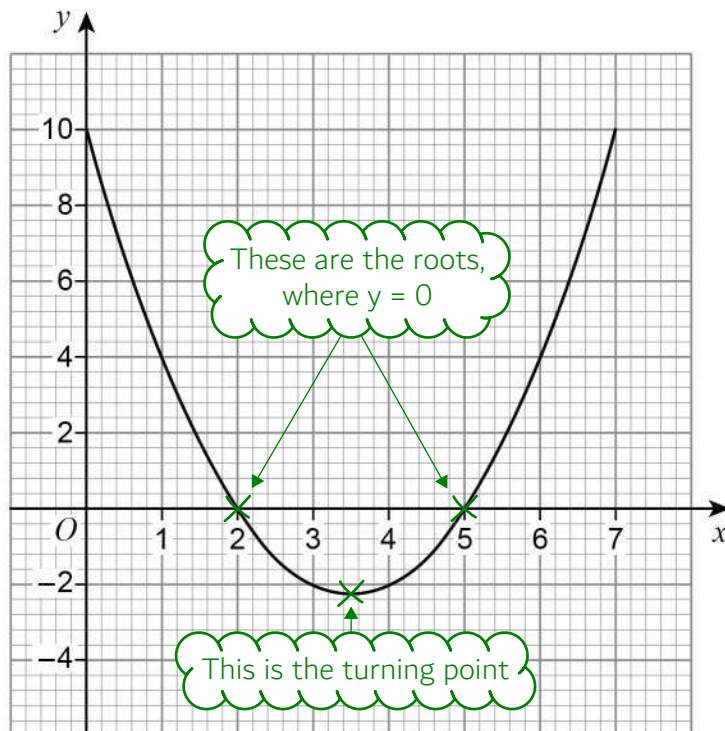
L is 5. There are twice as many medium bags

Answer 30 : 10 : 5

There are 30 small bags, 10 medium bags and 5 large bags. This is written as a ratio



- 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 2, 5

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

[1 mark]

Answer 3.5



23

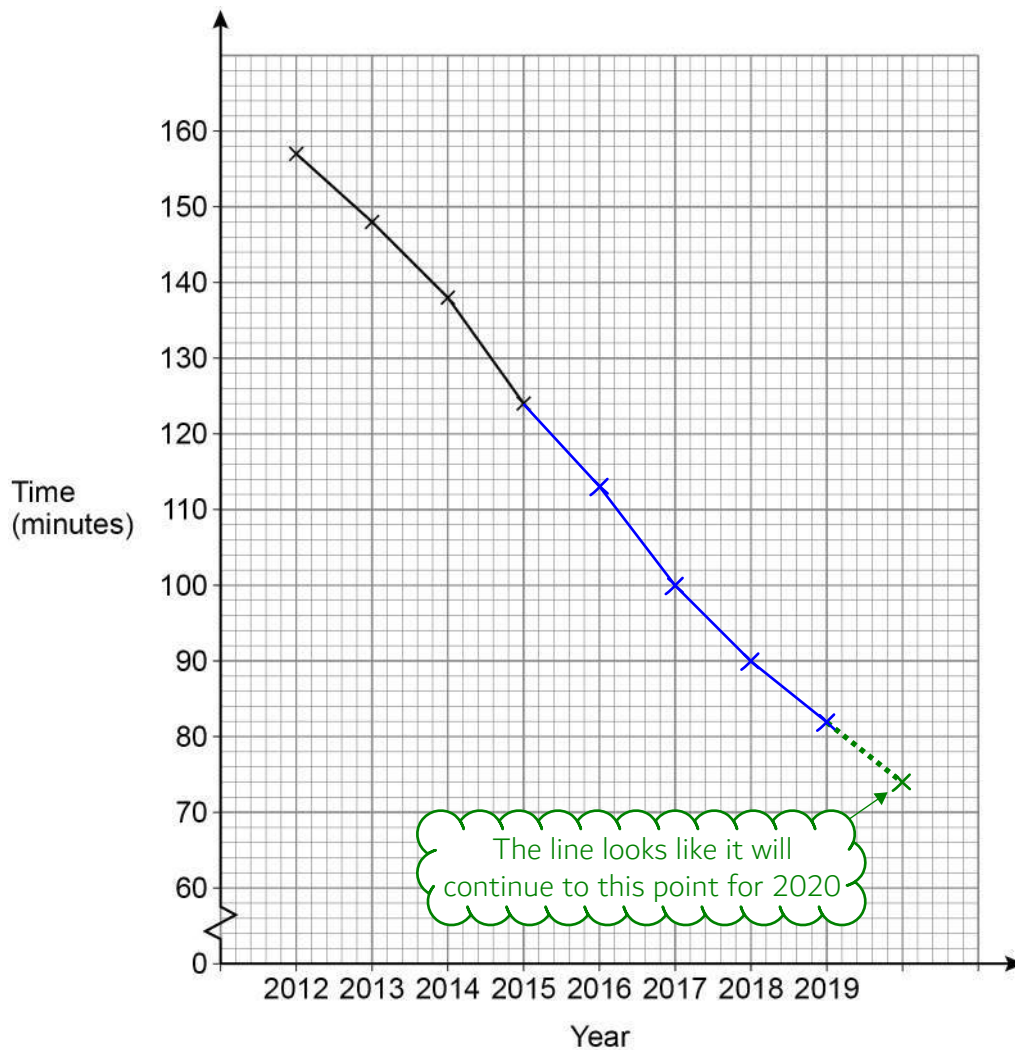
The time students spent watching TV was recorded.

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.



23 (a) Complete the graph.

[2 marks]

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

[1 mark]

Answer 74 minutes

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

[2 marks]

$$75 = 3 \times 5^2$$

$$105 = 3 \times 5 \times 7$$

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



$$3 \times 5$$

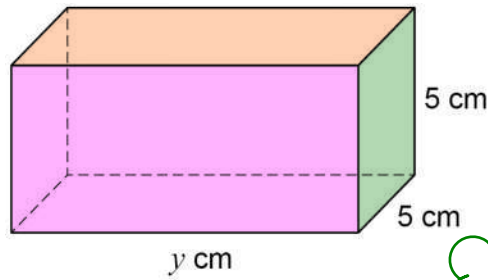
The highest common factor is the lowest power of each prime factor multiplied together. The lowest power of the 3s is 1, of the 5s is 1 and there are no 7s in 75

Answer 15

Turn over for the next question



25 Here is a cuboid.



Area of rectangle = length \times width.
Opposite faces on a cuboid are the same

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

Work out the volume of the cuboid.

[3 marks]

$$2 \times 5 \times 5 + 4 \times 5y = 200$$

Adding together the area of all of the faces on the cuboid gives the surface area

The area of two of the green face

The area of two of the pink and two of the orange faces

$$y = \frac{200 - 2 \times 5 \times 5}{4 \times 5}$$

Finding y by subtracting $2 \times 5 \times 5$ from both sides to get the y terms on their own then dividing by 4×5 to make y the subject

$$7.5 \times 5 \times 5$$

Volume of cuboid = length \times width \times height. The length is y , which is 7.5. The width and height are both 5

Answer 187.5 cm^3



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. If y is smaller the volume will be smaller

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

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

$$31 + 8 = 39$$

5

Turn over ►



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]

$$40 + \frac{40}{10} \times 11 = 84$$

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 greatest possible number of women is 40 as this is the greatest multiple of 10 less than 48. 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

The number of men when there is the greatest possible number of women. 10 parts of the ratio represent the 40 women so dividing by 10 works out 1 part. Multiplying by 11 works out 11 parts, which represents how many men there are



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]

$$\underline{5 \times 0.6 \times 50 + 24 - 5 \times 0.52 \times 50}$$

Alex's total score after all six tests. This is worked out by finding 60% of 50 (which is found by multiplying 0.6 by 50), multiplying by 5 to work out the total of the first five tests, then adding her score in the sixth test

The mean percentages were equal therefore they must have had the same total scores. Subtracting Bev's score after the first five tests from Alex's total score after all six tests leaves Bev's score in the sixth test

Bev's score after the first five tests. This is worked out by finding 52% of 50 (which is found by multiplying 0.52 by 50) then multiplying by 5

Answer 44 out of 50

Turn over for the next question



29

A solid piece of silver has
mass 2.625 kilograms
volume 250 cm³

Work out the density of the piece of silver.

Give your answer in grams per cubic centimetre.

[2 marks]

$$\frac{2.625 \times 1000}{250}$$

The units tell us that the mass in grams needs to be divided by the volume in cm³. There are 1000 grams in a kilogram so multiplying by 1000 converts the kilograms to grams

Answer 10.5 g/cm³

30

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

[2 marks]

$$\frac{9-3}{1-(-2)}$$

Gradient = (change in y)/(change in x). 9 - 3 works out the change in y. 1 - -2 works out the change in x

Answer 2

END OF QUESTIONS

