

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname StemUp Model Solution

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE MATHEMATICS

F

Foundation Tier Paper 2 Calculator

Thursday 4 June 2020

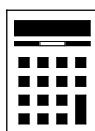
Morning

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	



J U N 2 0 8 3 0 0 2 F 0 1

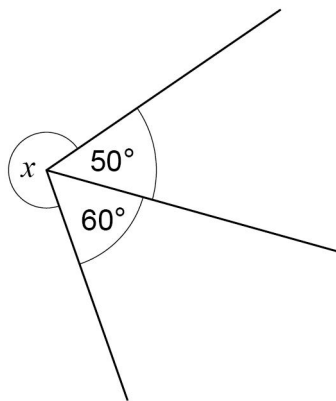
Answer **all** questions in the spaces provided.

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

[1 mark]

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

2

Not drawn
accuratelyCircle the size of angle x .

[1 mark]

 70° 110° 250° 270°

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

[1 mark]

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

- 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

- 5 (a) Solve $7x = 56$

[1 mark]

$$x = 56 \div 7$$

$$x = 8$$

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

[1 mark]

$$y = 25 - 18$$

$$y = 7$$



- 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

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

[2 marks]

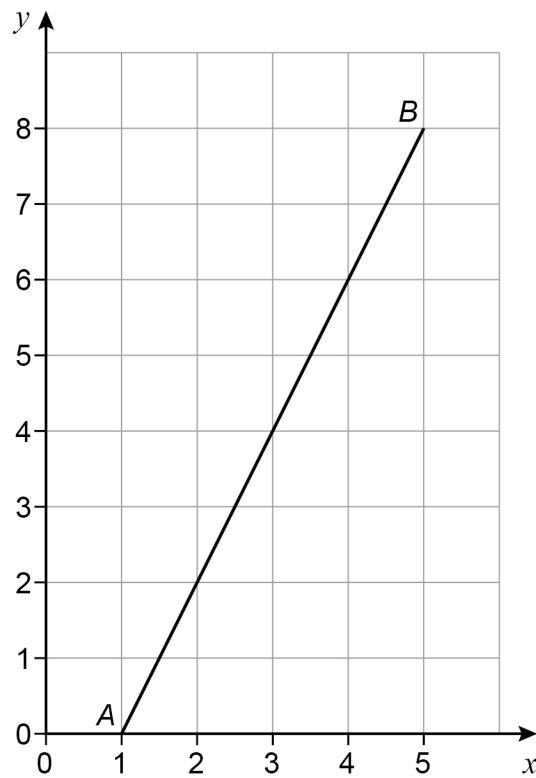
3 9 9 9 12 14 15 16 18 18 20

$(11 + 1) \div 2 = 6\text{th value}$

Answer _____ 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)

- 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 16

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

[2 marks]

$$5^3 = 125, \quad 6^3 = 216, \quad 7^3 = 343$$

$$(4^3 = 64 \text{ too small}, \quad 8^3 = 512 \text{ too big})$$

Answer 125, 216, 343

- 8 (c) Write down **two** numbers that
are multiples of 3
and
multiply to make 216

[1 mark]

$$12 \times 18 = 216$$

$$12 = 3 \times 4 \text{ and } 18 = 3 \times 6$$

Answer 12 and 18



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]

*18 + 54 + 38 = 110%, but the percentages
should add up to 100%*

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 Adults: $2 \times 120 = 240$

Junior fee: $120 \div 5 = 24$

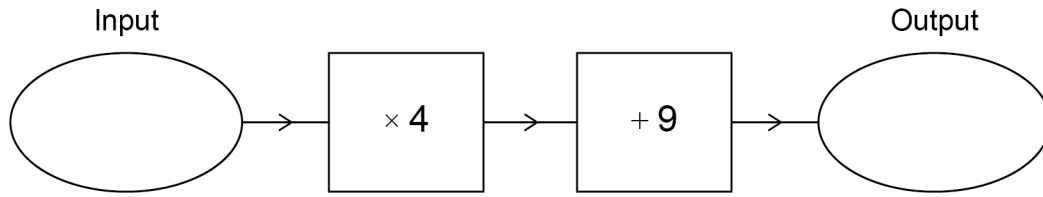
3 Juniors: $3 \times 24 = 72$

Total: $240 + 72 = 312$

Answer £ 312



10 (a) Here is a number machine.



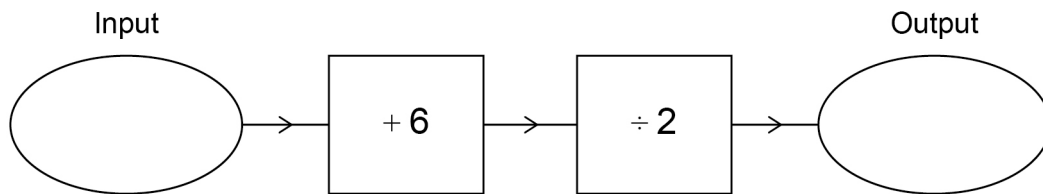
Work out the output when the input is 16

[1 mark]

$$16 \times 4 = 64, \quad 64 + 9 = 73$$

Answer 73

10 (b) Here is a different number machine.



Work out the output when the input is -48

[1 mark]

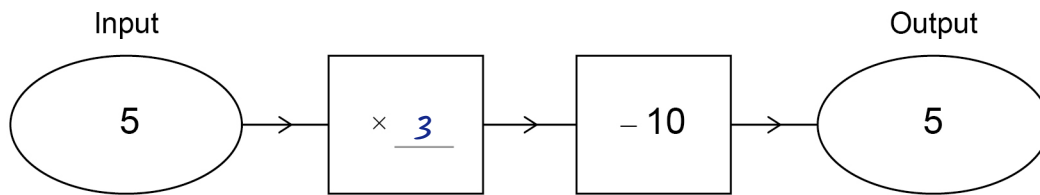
$$-48 + 6 = -42, \quad -42 \div 2 = -21$$

Answer -21



10 (c) Complete this number machine.

[1 mark]



11 Here are two calculations.

A
 $17^2 - 300$

B
 $47 \times 21 - 10^3$

Which calculation has the smaller answer?

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

[2 marks]

$A: 17^2 - 300 = 289 - 300 = -11$

$B: 47 \times 21 - 10^3 = 987 - 1000 = -13$

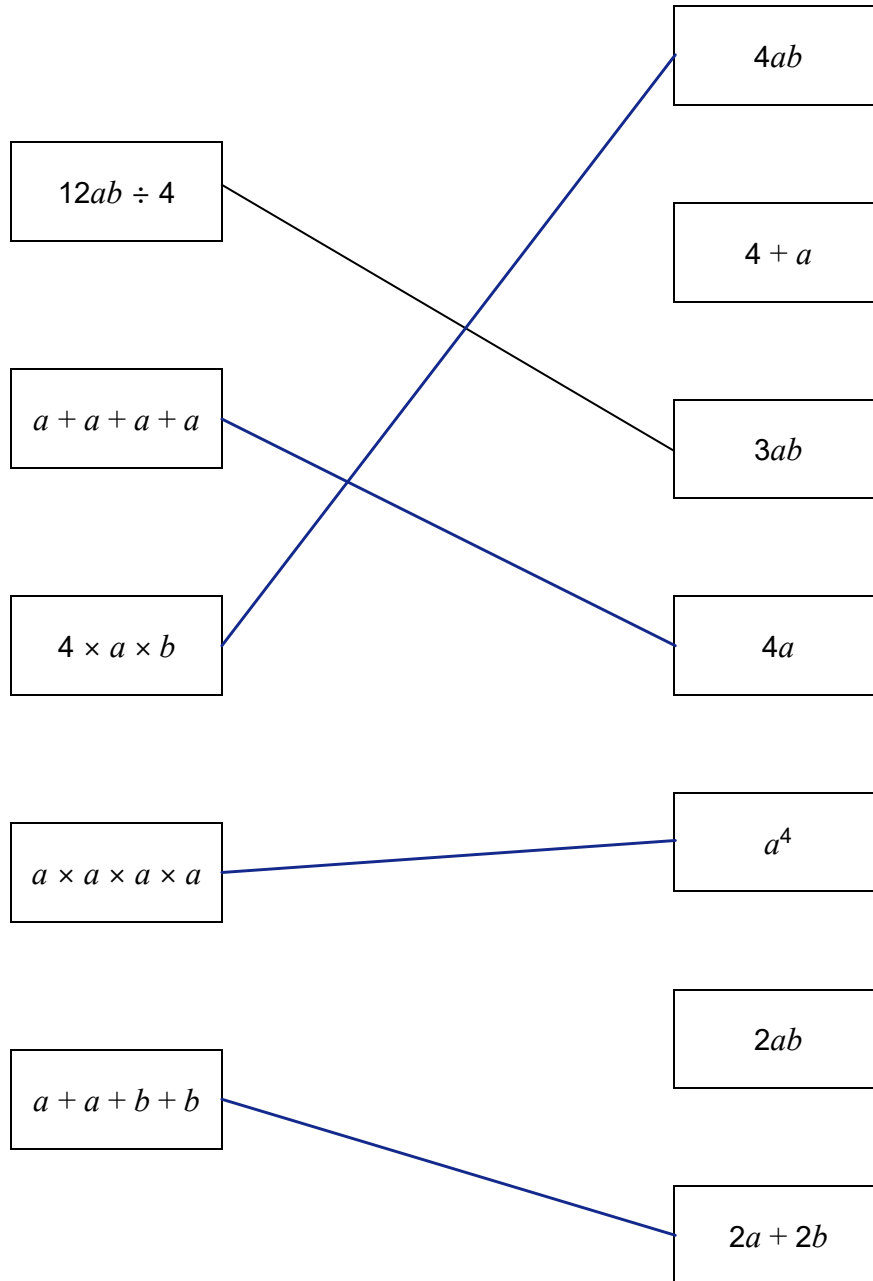
$-13 < -11$, so *B* is smaller

Answer B

Turn over ►



- 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]

$$\text{Jenny: } 318 \div 30 = \text{£}10.60 \text{ per hour}$$

$$\text{Calvin: } 287 \div 28 = \text{£}10.25 \text{ per hour}$$

$$10.60 - 10.25 = \text{£}0.35$$

$$= 35p$$

Answer 35 pence

Turn over for the next question

Turn over ►

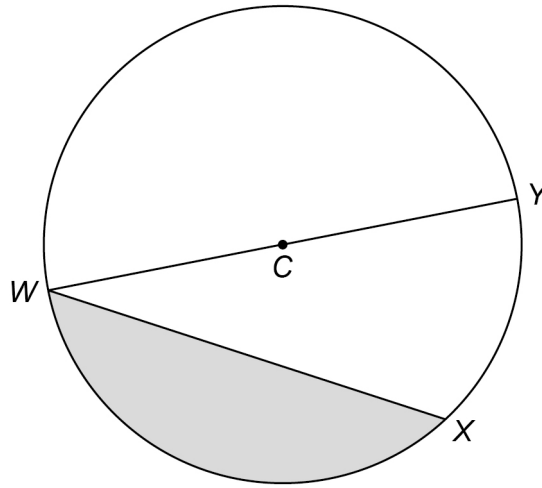


14

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.	☒	☐
WX is a radius.	☐	☒
The shaded section is a sector.	☐	☒
Arc XY is part of the circumference.	☒	☐



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]

$$\text{Cement: } 150 \times 0.19 = \text{£}28.50$$

$$\text{Sand: } 4 \times 150 = 600 \text{ kg}$$

$$600 \times 0.07 = \text{£}42$$

$$\text{Total: } 28.50 + 42 = \text{£}70.50$$

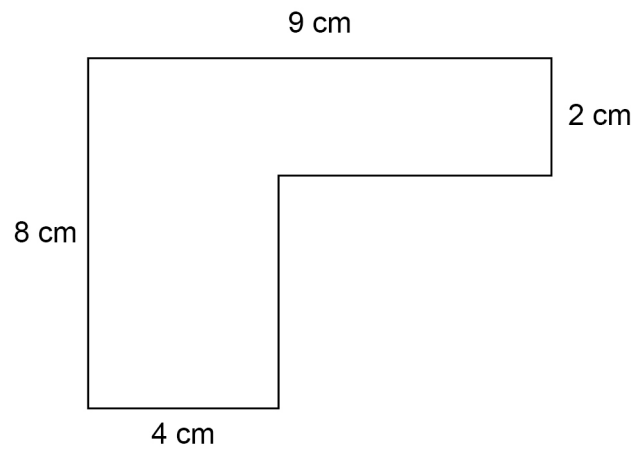
Answer £ 70.50

Turn over for the next question

Turn over ►



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



Not drawn
accurately

Work out the area.

[3 marks]

$$\text{Top rectangle: } 9 \times 2 = 18$$

$$\text{Bottom rectangle: } (8 - 2) \times 4 = 6 \times 4 = 24$$

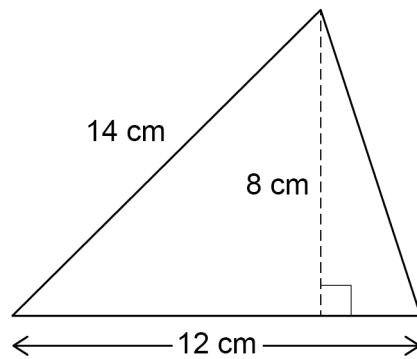
$$\text{Area} = 18 + 24$$

$$= 42$$

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]

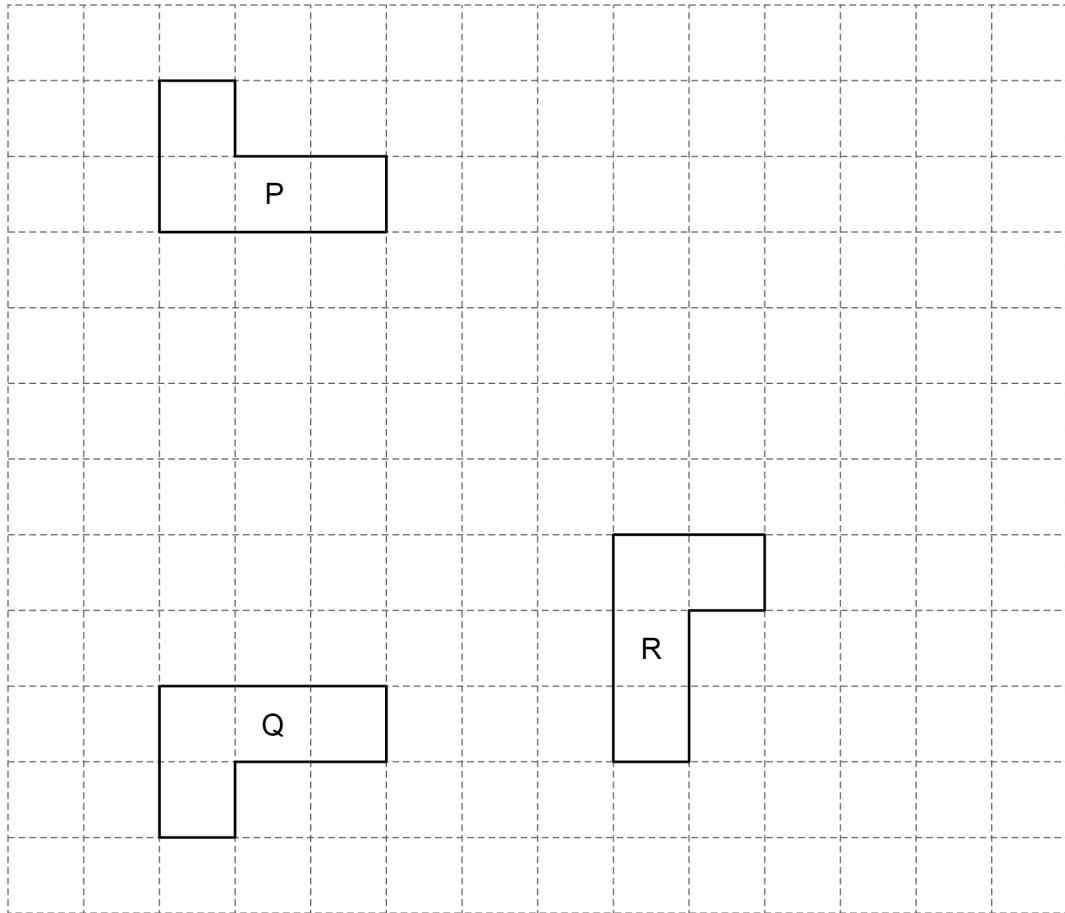
*He has not halved it. Area of a triangle = $\frac{1}{2} \times \text{base}$
 $\times \text{height}$, so it should be $\frac{1}{2} \times 12 \times 8 = 48 \text{ cm}^2$*

Turn over for the next question

Turn over ►



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

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

Circle the type of transformation.

[1 mark]

rotation

reflection

translation

enlargement



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]

$$\text{Food needed: } 14 \times 0.8 = 11.2 \text{ kg}$$

$$\text{Already has: } 2 \times 1.5 = 3 \text{ kg}$$

$$\text{Still needs: } 11.2 - 3 = 8.2 \text{ kg}$$

$$8.2 \div 1.5 = 5.466\dots$$

$$5 \text{ packs} = 7.5 \text{ kg (too little), } 6 \text{ packs} = 9 \text{ kg}$$

Answer 6

Turn over for the next question

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]

$$6.5 - 4 = 2.5 \text{ cm represents } 50 \text{ m}$$

$$50 \div 2.5 = 20$$

so 1 cm represents 20 m

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]

$$\text{Largest } a = 12, \text{ largest } b = 8$$

$$2 \times 12 + 8 = 24 + 8 = 32$$

Answer 32

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

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

[1 mark]

$$x = -1 \text{ and } y = -4$$

$$y \div x = -4 \div -1 = 4$$

Turn over for the next question

Turn over ►



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]

$$\text{Small: } 30 \times 8 = 240 \text{ sweets}$$

$$440 - 240 = 200 \text{ sweets in medium and large}$$

$$2 \text{ medium} + 1 \text{ large} = 2 \times 12 + 16 = 40 \text{ sweets}$$

$$200 \div 40 = 5$$

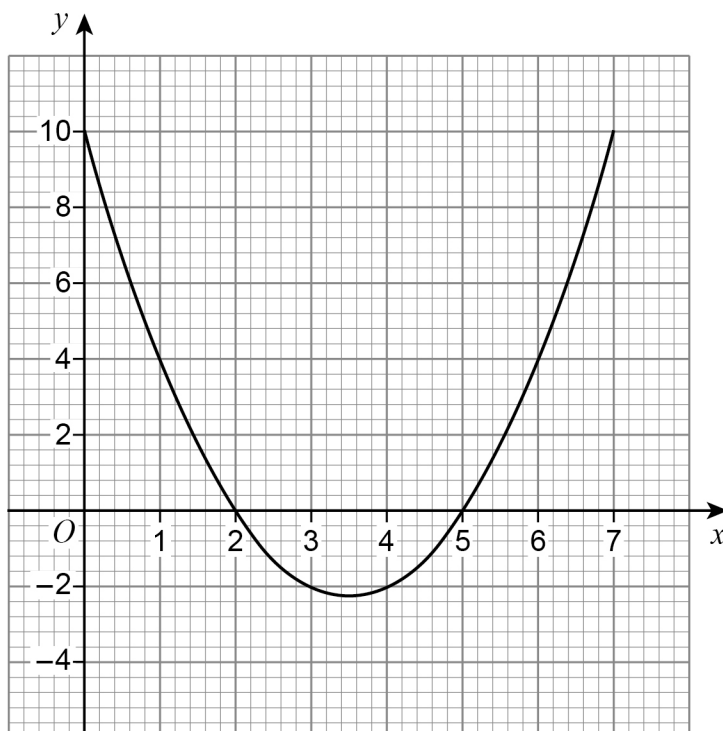
$$\text{Large} = 5 \text{ bags, medium} = 2 \times 5 = 10 \text{ bags}$$

$$\text{Check: } 10 \times 12 + 5 \times 16 = 120 + 80 = 200$$

Answer 30 : 10 : 5



- 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 $x = 2$ and $x = 5$

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

[1 mark]

Answer 3.5



23

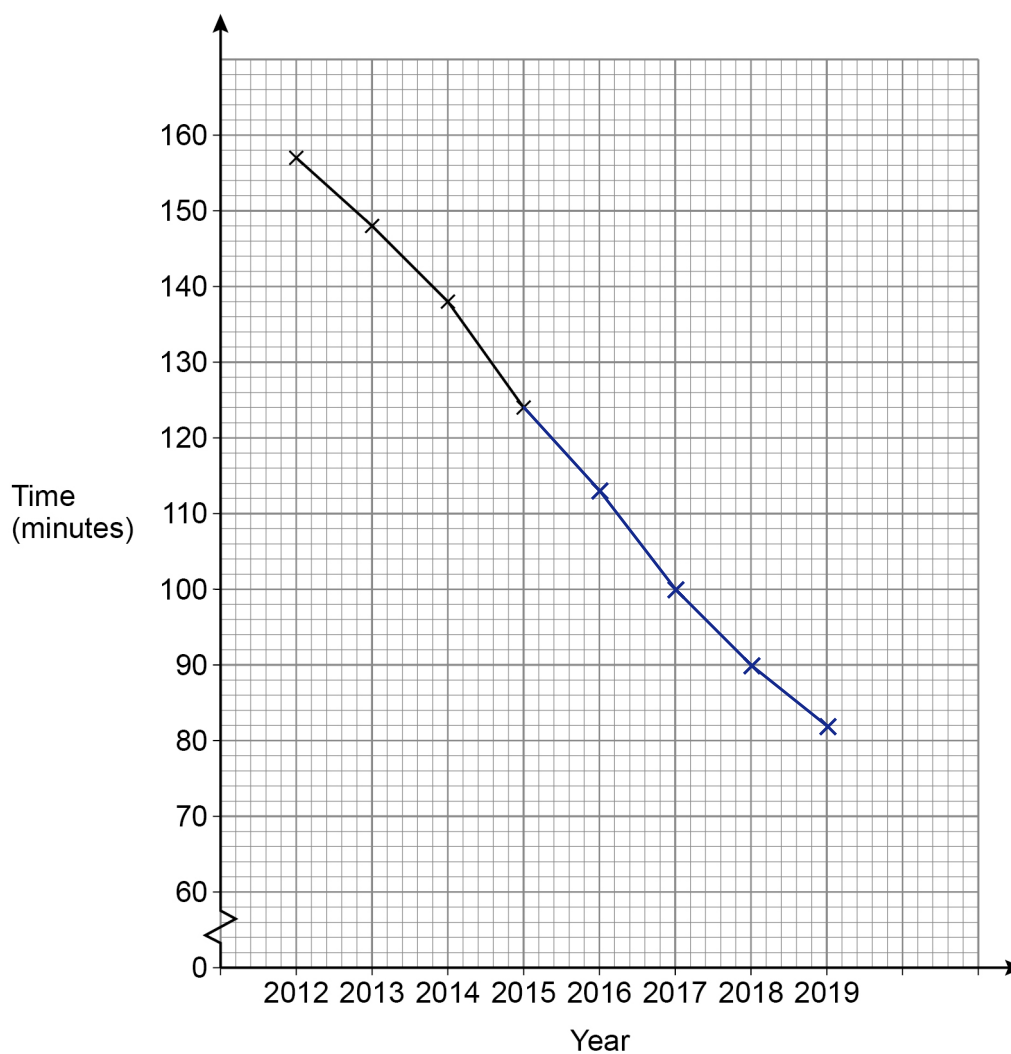
The time students spent watching TV was recorded.

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]

Decreases: 13, 10, 8 so next is about 8 less

$$82 - 8 = 74$$

Answer 74 minutes

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

[2 marks]

$$75 = 3 \times 5 \times 5$$

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

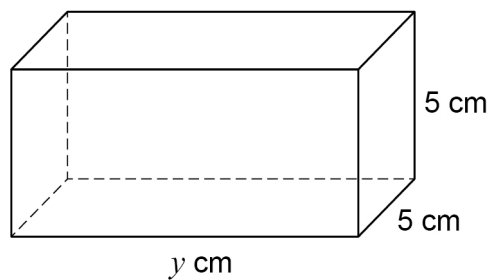
$$HCF = 3 \times 5 = 15$$

Answer 15

Turn over for the next question



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]

$$\text{Two end faces: } 2 \times 5 \times 5 = 50$$

$$\text{Other four faces: } 200 - 50 = 150$$

$$4 \times 5 \times y = 150, \text{ so } 20y = 150$$

$$y = 150 \div 20 = 7.5$$

$$\text{Volume} = 5 \times 5 \times 7.5 = 187.5$$

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

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

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

[1 mark]

9

11

31

39



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]

Some women leave, so fewer than 48 women

$10 : 11 = 20 : 22 = 30 : 33 = 40 : 44 = 50 : 55$

Women must be 40 (50 is more than 48)

$40 + 44 = 84$ people, and $84 < 90$, so No



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]

$$\text{Alex: } 24 \text{ out of } 50 = 24 \div 50 \times 100 = 48\%$$

$$\text{Alex total of 6 tests} = 60 \times 5 + 48 = 348\%$$

$$\text{Bev total of 5 tests} = 52 \times 5 = 260\%$$

$$\text{Bev 6th test} = 348 - 260 = 88\%$$

$$88\% \text{ of } 50 = 0.88 \times 50 = 44$$

Answer 44 out of 50

Turn over for the next question

Turn over ►



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]

$$2.625 \text{ kg} = 2625 \text{ g}$$

$$\text{Density} = 2625 \div 250 = 10.5$$

Answer 10.5 g/cm³

30

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

[2 marks]

$$\text{Gradient} = (9 - 3) \div (1 - (-2))$$

$$= 6 \div 3 = 2$$

Answer 2

END OF QUESTIONS



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ANSWER IN THE SPACES PROVIDED**



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Question number	Additional page, if required. Write the question numbers in the left-hand margin.
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