AQA

Model Solutions

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE MATHEMATICS

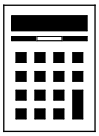
F

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	

Do not write outside the box

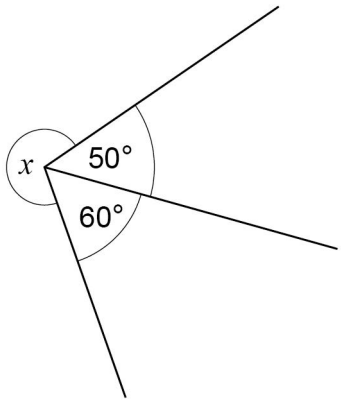
Answer **all** questions in the spaces provided.

1 Circle the ratio that is the same as 3 : 4 **[1 mark]**

3 : 4 ×2 → 6 : 8 ×2

6 : 7 | **6 : 8** | 6 : 9 | 6 : 16

2



Not drawn accurately

Circle the size of angle x. **[1 mark]**

angles at a point add up to 360

$360 = x + 50 + 60$

$360 = x + 110$

$x = 360 - 110 = 250$

70° | 110° | **250°** | 270°

3 Circle the expression that has the **smallest** value when $x = 4$ **[1 mark]**

$5 - 4 = 1$ | $\frac{1}{2} \times 4 = 2$ | $4 + 1 = 5$ | $4 - 4 = 0$

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

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

2 , 6 , __

→ 6+1 = 7 → 7×2 = 14

Circle the next term.

[1 mark]

9 13 (14) 18

5 (a) Solve $7x = 56$

[1 mark]

$x = \frac{56}{7} = \frac{7 \times 8}{7}$

$x =$ 8

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

[1 mark]

+y−18

$25 - 18 = y$

$y =$ 7

6

Turn over ▶

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. ← Highest repeating score

[1 mark]

Answer 9

6 (b) Work out the median.

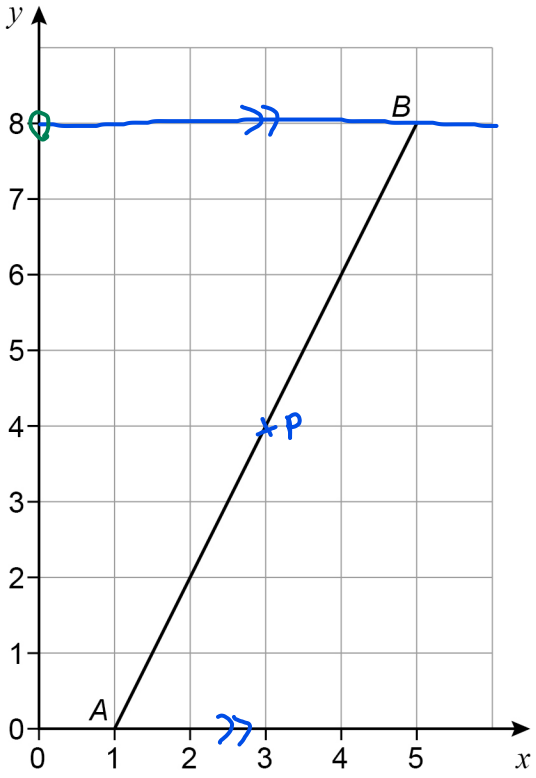
$\frac{(n+1)}{2}$ th value ; $\frac{11+1}{2}$ th = $\frac{12}{2}$ th = 6th **[2 marks]**

arrange in ascending : 3, 9, 9, 9, 12, 14, 15, 16, 18, 18, 20

Answer 14

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.

Work out the coordinates of P.

(x, y)

[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)

5

Do not write outside the box

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

[1 mark]

$2^2 = 4$ also even

Answer 4

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

[2 marks]

$4^3 = 64$ $5^3 = 125$ $6^3 = 216$ $7^3 = 343$ $8^3 = 512$

Answer 125, 216, 343

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

are multiples of 3

and

multiply to make 216

[1 mark]

216

1 216

2 108

3 72 Multiples of 3

Answer 3 and 72

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]

18% + 54% + 38% = 110% There is an additional 10% as a member can't be two types.

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]

Total : 2A + 3J

J : £120 × $\frac{1}{5}$ = £24

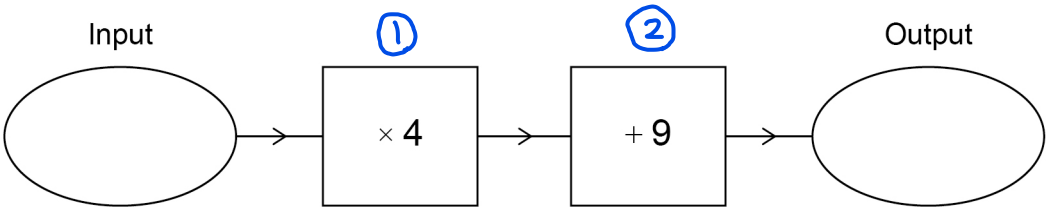
Total = 2(£120) + 3(£24) = £240 + £72

Answer £ 312

8

Do not write outside the box

10 (a) Here is a number machine.



Work out the output when the input is 16

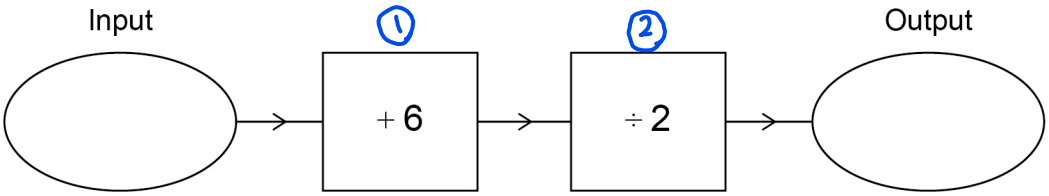
[1 mark]

1 2

16 × 4 = 64 64 + 9 = 73

Answer 73

10 (b) Here is a different number machine.



Work out the output when the input is –48

[1 mark]

1 2

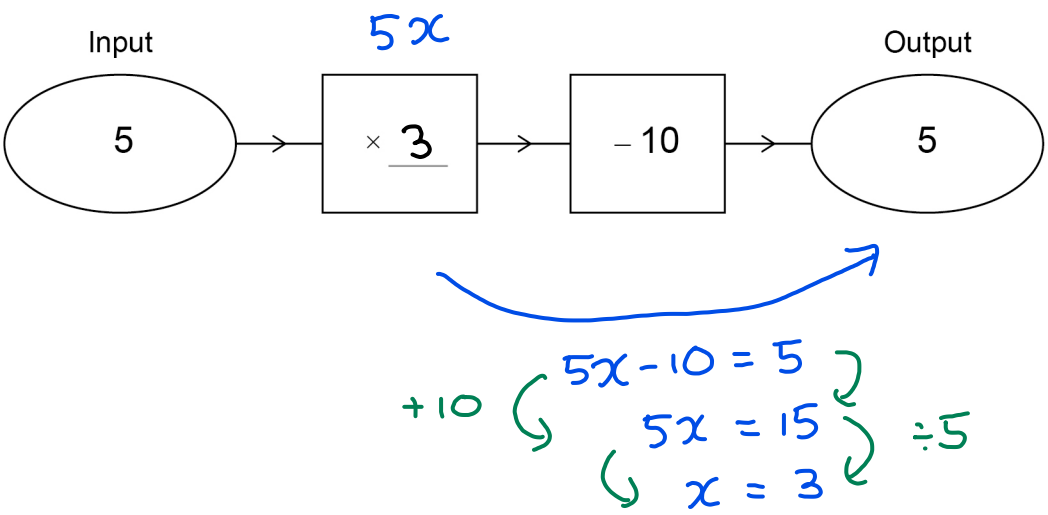
−48 + 6 = −42 −42 ÷ 2 = −21

Answer −21

Do not write outside the box

10 (c) Complete this number machine.

[1 mark]



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]

A: $17^2 - 300 = (17 \times 17) - 300 = 289 - 300 = -11$

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

$-13 < -11$; B < A

Answer B

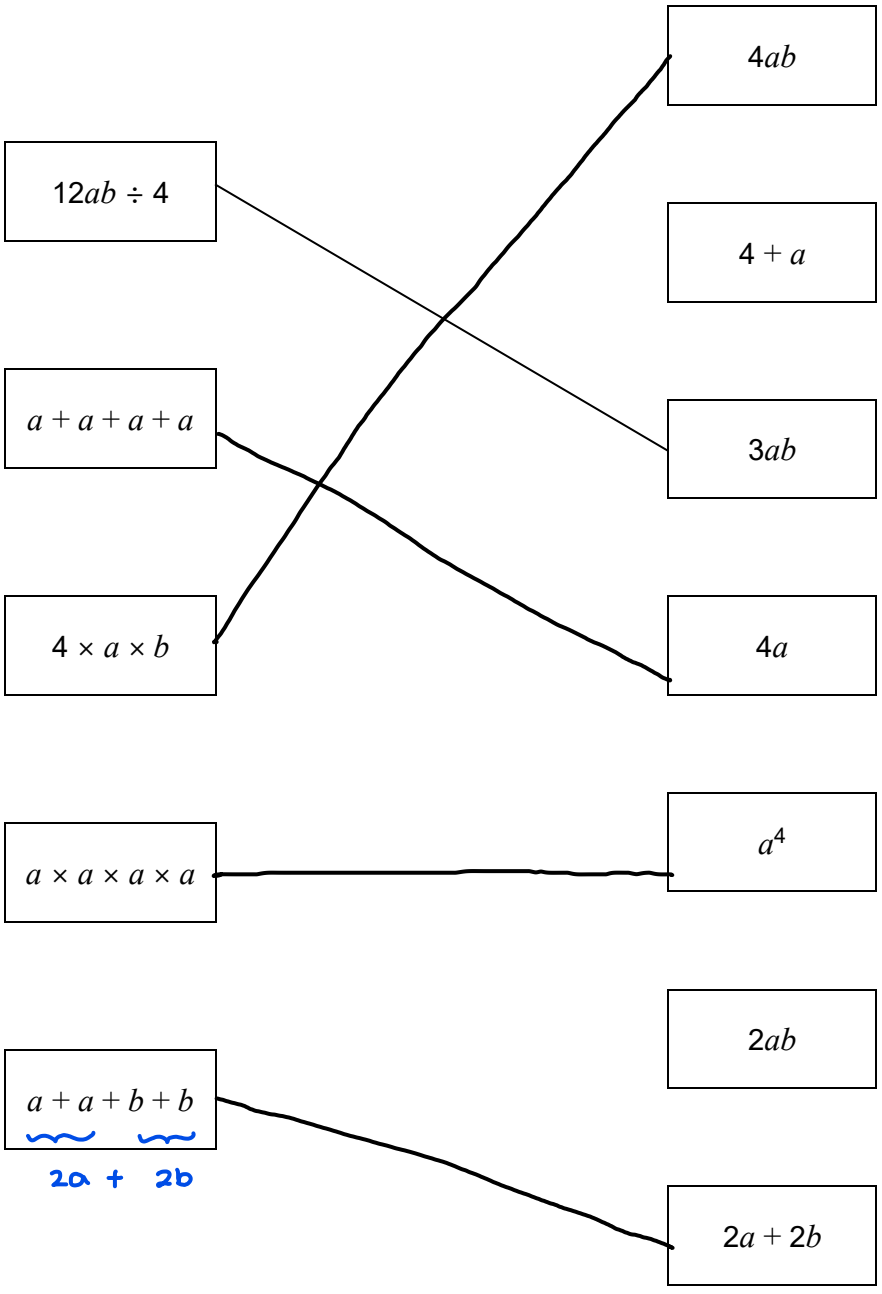
5

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]



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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]

Jenny = $\frac{£318}{30}$ = £10.6

Calvin = $\frac{£287}{28}$ = £10.25

Difference = £10.6 − £10.25 = £0.35

= 35 p

Answer 35 pence

Turn over for the next question

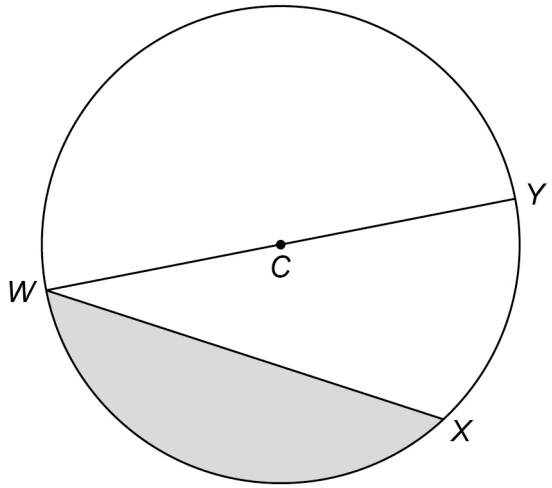
7

Do not write outside the box

14 This circle has centre C.

W, X and Y are points on the circle.

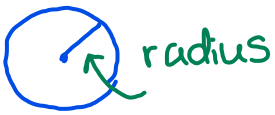
WY is a straight line.

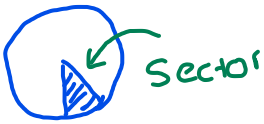


Tick **one** box for each statement.

[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.	✓	





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]

Cement cost = Price per kg × 150 kg

= £0.19 × 150 = £28.50

4 kg sand per 1 kg cement

Amount of Sand = 4 × 150 = 600 kg

Cost of Sand = £0.07 × 600 = £42

Total cost = £42 + £28.50 = £70.50

Answer £ 70.50

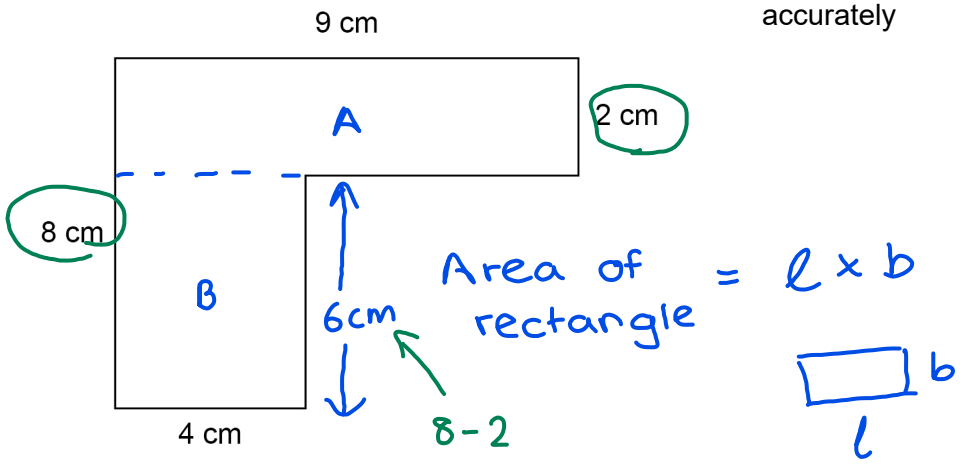
Turn over for the next question

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]

A : $9 \times 2 = 18\ cm^2$

B : $6 \times 4 = 24\ cm^2$

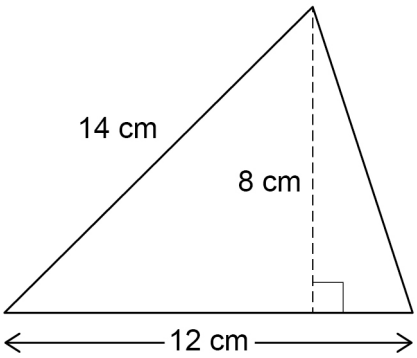
Total area = $18 + 24\ cm^2$

$= 42\ cm^2$

Answer 42 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]

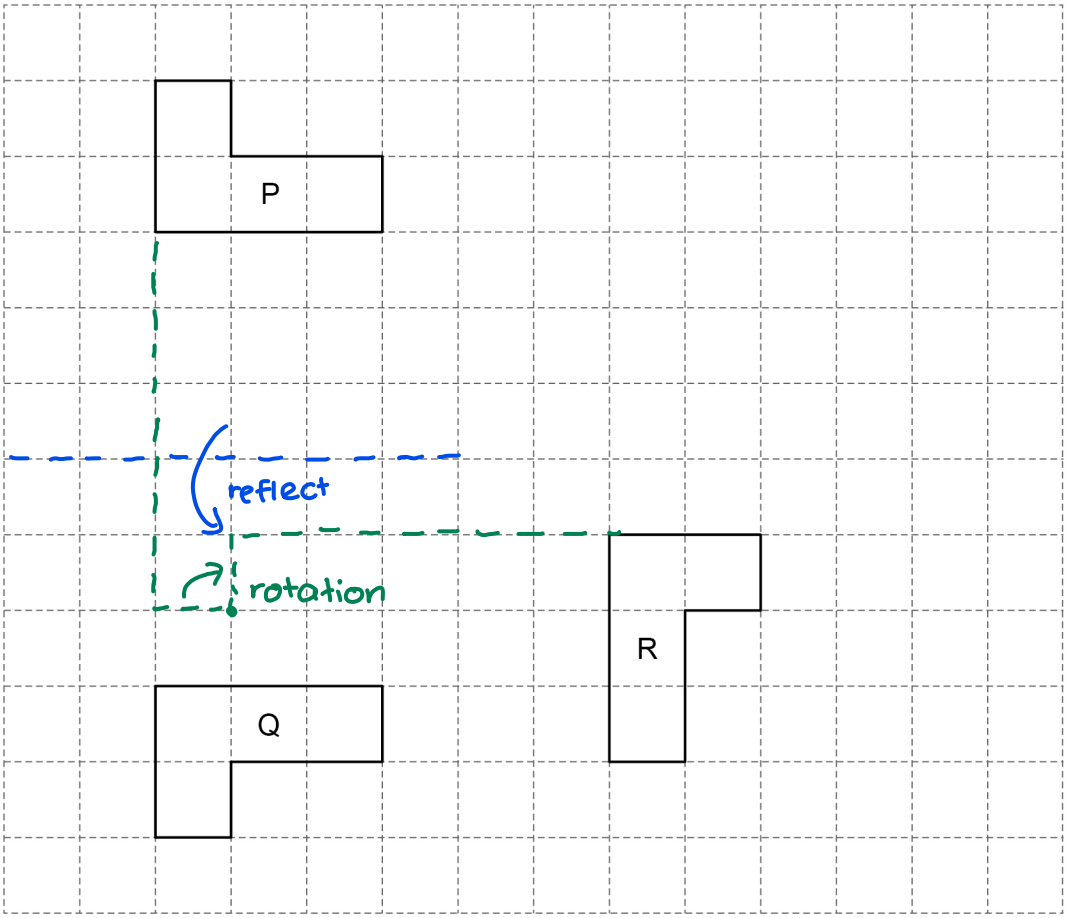
The correct formula is '$\frac{1}{2} \times b \times h$' but Zak has used 'Area = b x h.' Therefore the answer has to be Area = $\frac{1}{2} \times 12 \times 8 = 48 \text{ cm}^2$

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

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

Circle the type of transformation.

[1 mark]

rotation reflection translation enlargement

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]

per week ↙ no. of weeks ↙

kg of food needed for 14 weeks = $0.8 \times 14 = 11.2$ kg

kg of food to purchase = $11.2\text{ kg} - (1.5\text{ kg} \times 2)$

$= 11.2\text{ kg} - 3\text{kg} = 8.2\text{ kg}$

No. of packs to purchase = $\frac{8.2\text{kg}}{1.5\text{kg}} = 5.47$

≈ 6

(round up because cannot buy a fraction of pack)

Answer 6

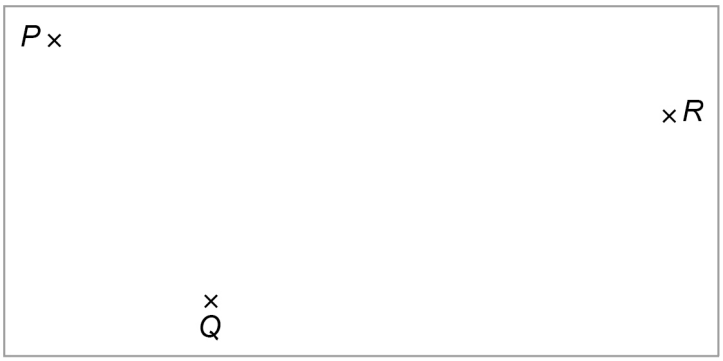
Turn over for the next question

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 *QR* = 6.5 cm

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

Work out the scale.

[3 marks]

Scale drawing difference = 6.5 − 4 = 2.5 cm

between PQ and QR

∴ 2.5 cm represent 50 m ÷2.5

1 cm represent 20 m

Answer 1 cm represents 20 metres

Do not write outside the box

20 (a) a and b are whole numbers.

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

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

[2 marks]

highest

$a = 12, 11, 10, 9, 8, \ldots$

Largest possible

highest

$b = 8, 7, 6, 5, \ldots$

$2a + b = 2(12) + 8 = 32$

Answer 32

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

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

[1 mark]

In the case $x = -4$ and $y = -16$;

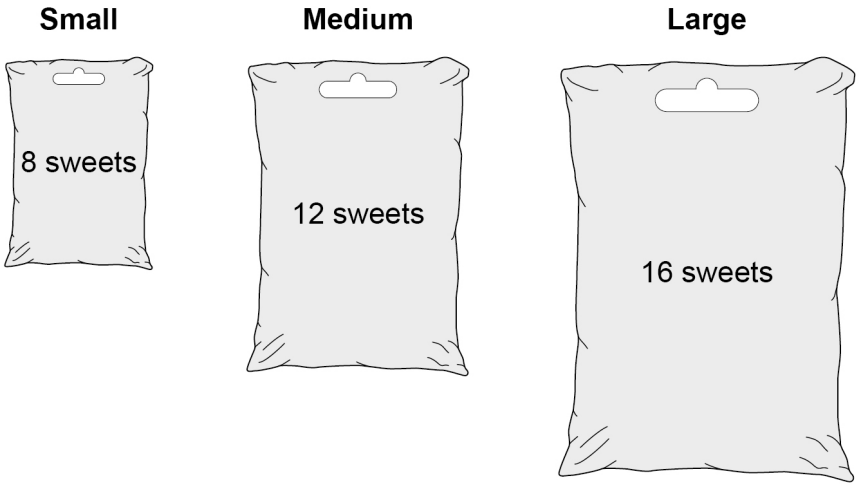
$\frac{y}{x} = \frac{-16}{-4} = \frac{16}{4} = 4$ //

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]

Per small bag ↘ ↙ No. of small bags

Total sweets in small bags = 8 × 30 = 240 sweets

No. of sweets remaining = 440 − 240 = 200 sweets

↳ Medium + Large

Medium : Large

2 : 1

medium has 2× bags as large → 12 × 2 : 16 sweets

×5 ↘ 120 : 80 → 120 ÷ 12 = 10 bags (120 sweets in medium)

↘ 120 + 80 = 200 sweets

Small : Medium : Large

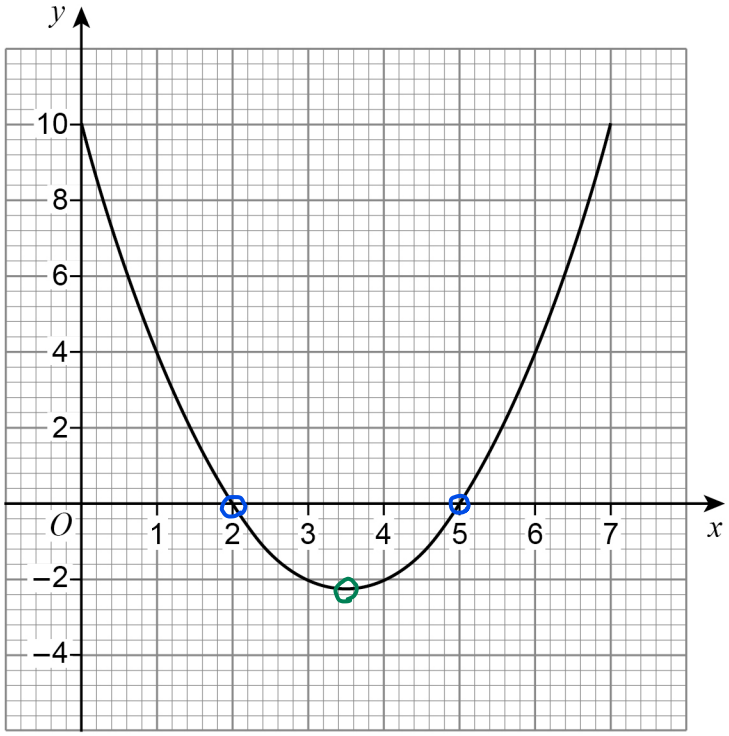
÷5 ↘ 30 : 10 : 5

6 : 2 : 1

Answer 6 : 2 : 1

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]

x - coordinates where the graph cuts the x-axis.

Answer $x = 2, 5$

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

[1 mark]

circled in green

Answer 3.5

7

Do not write outside the box

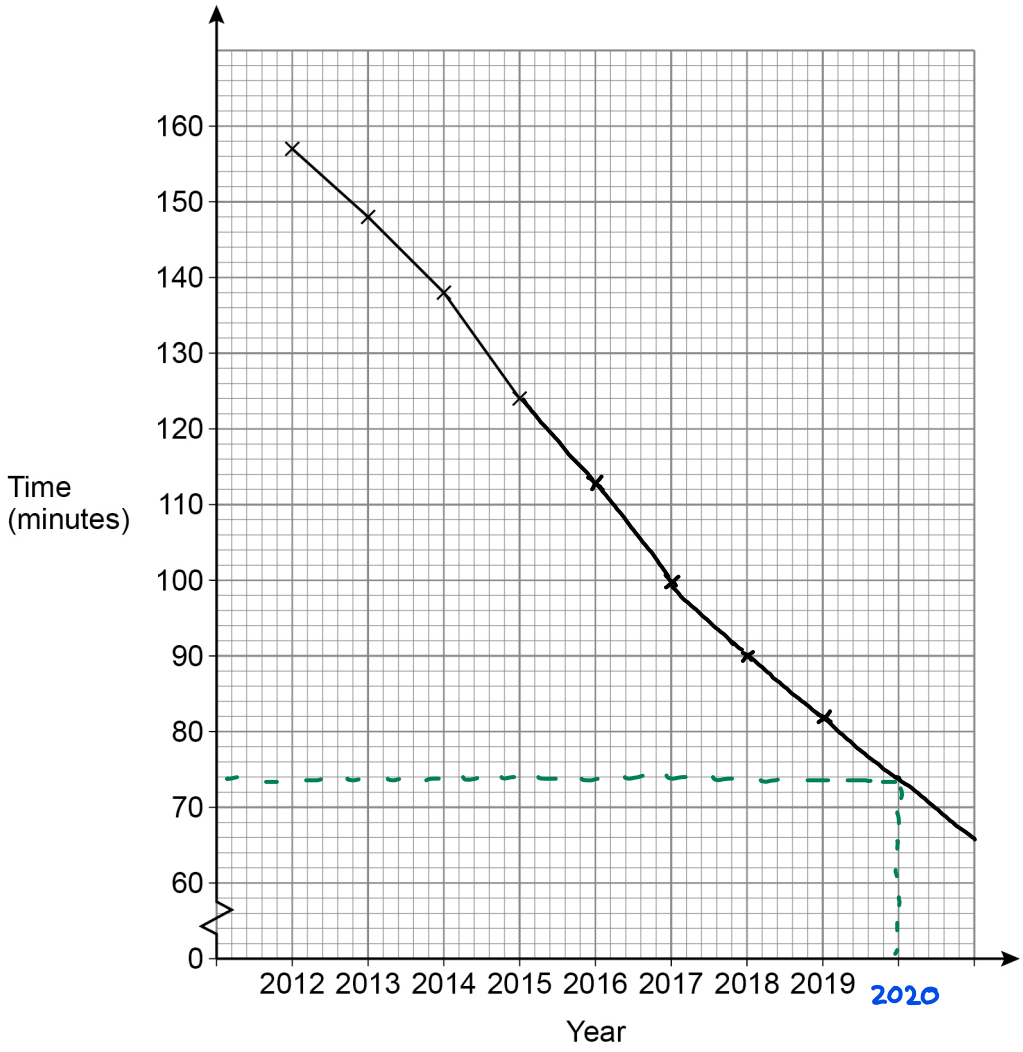
23 The time students spent watching TV was recorded.

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.



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]

Answer 74 minutes

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

[2 marks]

Factors of 75: 3, 5, 15, 25, 75

Factors of 105: 3, 5, 7, 15, 21, 35, 105

15 is the highest common factor

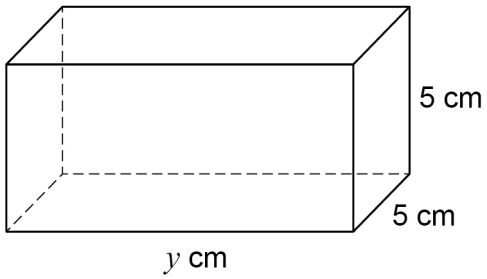
Answer 15

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]

Front and back — Left and Right — Top and bottom

Total surface area = $2 \times y \times 5 + 2 \times 5 \times 5 + 2 \times y \times 5$

$= 10y + 50 + 10y = 20y + 50$

$20y + 50 = 200\ cm^2$

$20y = 150$

$y = \frac{150}{20}$

$= 7.5\ cm$

$\therefore$ Volume $= l \times b \times h$

$= 7.5 \times 5 \times 5$

$= 187.5\ cm^3$

Answer 187.5 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

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

31+8 = 39

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]

New women < 48 (women left)

New men > 42 (men arrived)

women : men
10 : 11
20 : 22
30 : 33
40 : 44 ← agrees to both statements
50 : 55

∴ 40 + 44 = 84

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 $\longrightarrow$ $\frac{24}{50} \times 100\% = 48\%$

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

[4 marks]

Alex's mean percentage after 6th test: $\frac{60\% \times 5 + 48\%}{6} = \frac{348\%}{6}$

$= 58\%$

Bev's mean percentage after 6th test = 58%

Bev's percentage mark for 6th test = $58\% = \frac{52\% \times 5 + x}{6}$

$58 \times 6 = 52 \times 5 + x$

$348 = 260 + x$

$88 = x$

88% of 50 marks = $\frac{88}{100} \times 50 = \frac{88}{2} = 44$

Answer 44 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

density = mass / volume

Work out the density of the piece of silver.

Give your answer in grams per cubic centimetre.

[2 marks]

density = $\frac{2.625 \times 1000}{250} = \frac{2625}{250}$

↳ kilograms → grams

Answer 10.5 g/cm^3

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

(x_2 y_2) (x_1 y_1)

[2 marks]

gradient = $\frac{y_1 - y_2}{x_1 - x_2} = \frac{9-3}{1-(-2)} = \frac{6}{1+2} = \frac{6}{3} = 2$

Answer 2

END OF QUESTIONS

4

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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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