AQA

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE MATHEMATICS

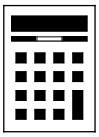
F

Foundation Tier Paper 3 Calculator

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
- a calculator
- mathematical instruments
- the Formulae Sheet (enclosed).



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	
28–29	
TOTAL	

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

Do not write outside the box

1 What is $\frac{1}{4}$ as a percentage?

Circle your answer.

[1 mark]

10% 25% 40% 75%

2 Circle the number that is a factor of 10

[1 mark]

7 6 5 4

3 Circle the value of the digit 9 in 0.094

[1 mark]

$\frac{9}{100}$ $\frac{9}{10}$ $\frac{1}{90}$ $\frac{1}{9}$

Do not write outside the box

4 Simplify $4 \times 2c$ = 8c

Circle your answer.

[1 mark]

$42c$ $16c$ $8c$ $6c$

1

5 (a) Write a suitable unit for measuring each amount.

One has been done for you.

[2 marks]

	Unit
Distance from London to Manchester	kilometres
Length of a pencil	centimetres 1
Mass of a pound coin	grams 1

Turn over for the next question

6

Do not write outside the box

5 (b) Times for the three parts of a journey are

- 20 minutes
- 40 minutes
- 1 hour 30 minutes.

Work out the **total** time for the journey.

Give your answer in hours.

[2 marks]

20 mins + 40 mins + 1 hour 30 mins = 2 hour 30 minutes (1)

$= 2 + \frac{30}{60}$ hours

= 2.5 hours (1)

Answer 2.5 hours

Do not write outside the box

6 Pens cost 20p each.

Rulers cost 60p each.

Saj buys some pens and some rulers.

He buys 8 rulers.

The total cost is £10

How many pens does he buy?

[3 marks]

let number of pens = x

$8 \times 0.60 + 0.20x = 10$

$4.80 + 0.20x = 10$ (1)

$0.20x = 5.20$ (1)

$x = 26$ (1)

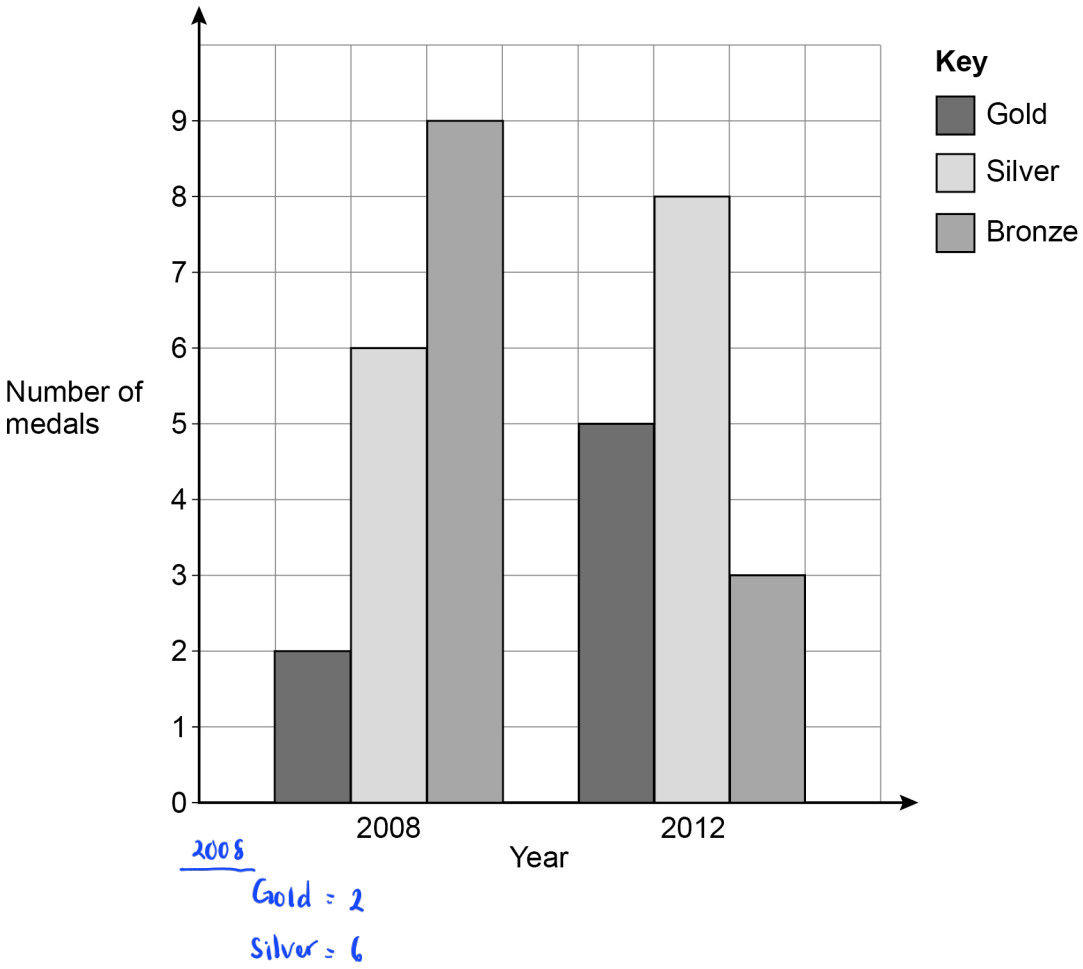
Answer 26

Turn over for the next question

5

Do not write outside the box

7 The bar chart shows the number of medals won by a country at events in 2008 and 2012



7 (a) Complete this statement about the medals won by the country in 2008

[1 mark]

number of Silver medals = 3 (1) × number of Gold medals

Do not write outside the box

7 (b) Show that the country won **more** medals in 2008 than in 2012

[2 marks]

2008 : 2 + 6 + 9 = 17 (1)

2012 : 5 + 8 + 3 = 16 (1)

7 (c) At the 2016 event the country won an **equal** number of each type of medal.

Here is a statement about the medals won by the country in 2016

The total number of medals **cannot** be 25

Give a reason why the statement is correct.

[1 mark]

25 is not a multiple of 3. (1)

Turn over for the next question

4

Do not write outside the box

8 In this question use 1 litre = 1000 millilitres

A mixture is made using white paint and red paint.

amount of white paint = amount of red paint ÷ 7

5.6 litres of red paint will make **more** than 6 litres of the **mixture**.

How much more?

Give your answer in millilitres.

[4 marks]

White paint = $\frac{5.6}{7}$ = 0.8 (1)

Mixture = 5.6 + 0.8 = 6.4 (1)

6.4 − 6.0 = 0.4 ℓ × $\frac{1000 \text{ ml}}{1 \text{ ℓ}}$ (1)

= 400 ml

Answer 400 (1) ml

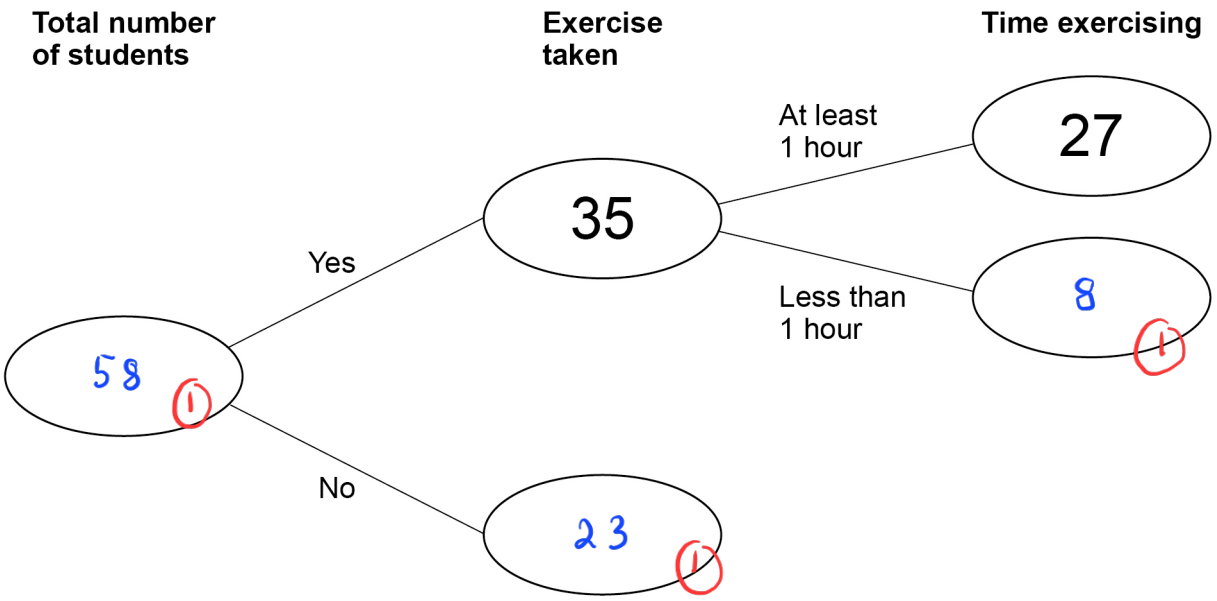
Do not write outside the box

9 Some students were asked about their daily exercise.

9 (a) 12 **more** students answered Yes than answered No.

Complete the frequency tree.

[3 marks]



9 (b) One of the 35 students who answered Yes is chosen at random.

What is the probability that they exercise for at least 1 hour?

[1 mark]

Answer $\frac{27}{35}$

8

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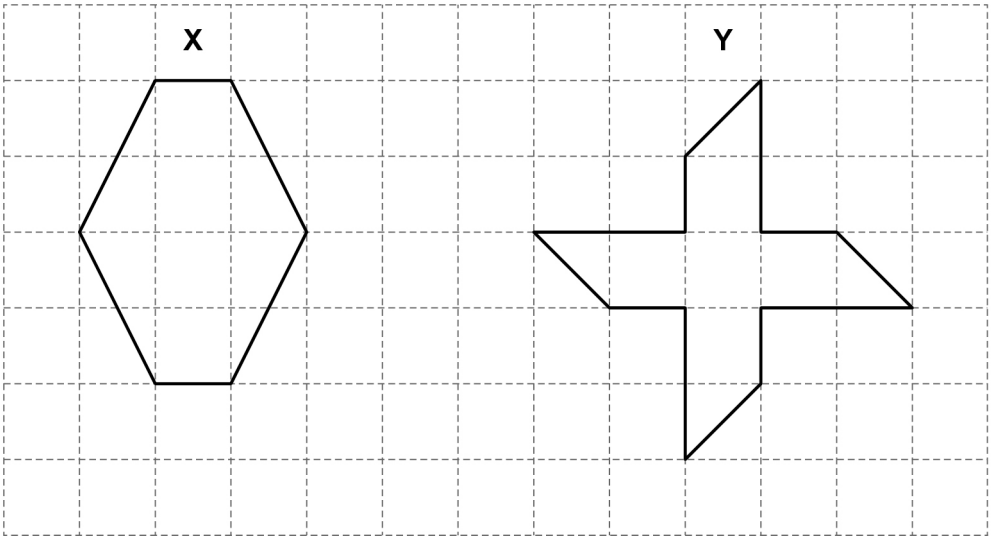
10 Shapes X and Y are shown on a centimetre grid.



10 (a) Circle the name of shape **X**.

[1 mark]

pentagon hexagon octagon decagon

1

10 (b) Give a reason why shape **Y** is **not** a regular polygon.

[1 mark]

Sides are not equal

1

10 (c) Complete these statements.

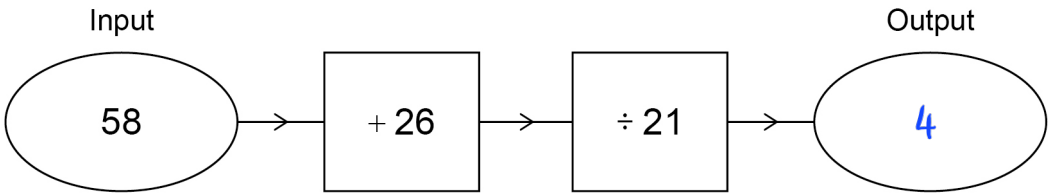
[2 marks]

The number of lines of symmetry of shape **X** is 2 1

The order of rotational symmetry of shape **Y** is 4 1

Do not write outside the box

11 (a) Here is a number machine.



Work out the output.

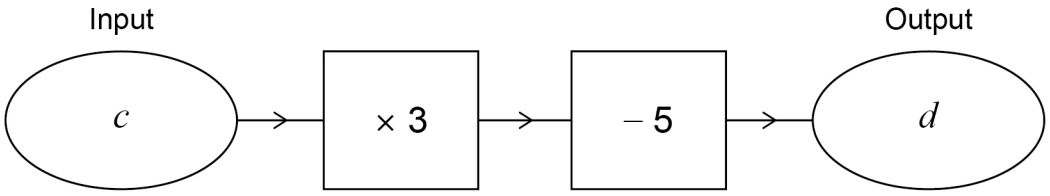
[1 mark]

58 + 26 = 84

84 ÷ 21 = 4

Answer 4 (1)

11 (b) Here is a different number machine.



Work out a formula for d in terms of c.

[2 marks]

3c − 5 = d

Answer d = 3c − 5 (1)

7

Do not write outside the box

12 (a) Simplify fully $9x + y - 6x + y$

[2 marks]

$9x - 6x + y + y$

$= 3x + 2y$ (2)

Answer $3x + 2y$

12 (b) Here are two expressions.

$8a$	$a^2 - b$

When $a = 25$ the expressions have the same value.

Work out the value of b.

[3 marks]

$8(25) = 200$ (1)

$a^2 - b = 200$

$25^2 - b = 200$

$625 - b = 200$ (1)

$b = 625 - 200 = 425$ (1)

$b =$ 425

Do not write outside the box

12 (c) Simplify $\frac{6w+10}{2}$ = 3w + 5

Circle your answer.

[1 mark]

$6w + 8$ $3w + 10$ $6w + 5$ $3w + 5$

1

13 In a bag,

number of green discs : number of blue discs = 20 : 11

Tick **one** box for each statement about the discs in the bag.

[2 marks]

	True	False	Cannot tell
There are more green discs than blue discs.	✓ 1		
In total there are 31 discs.			✓ 1

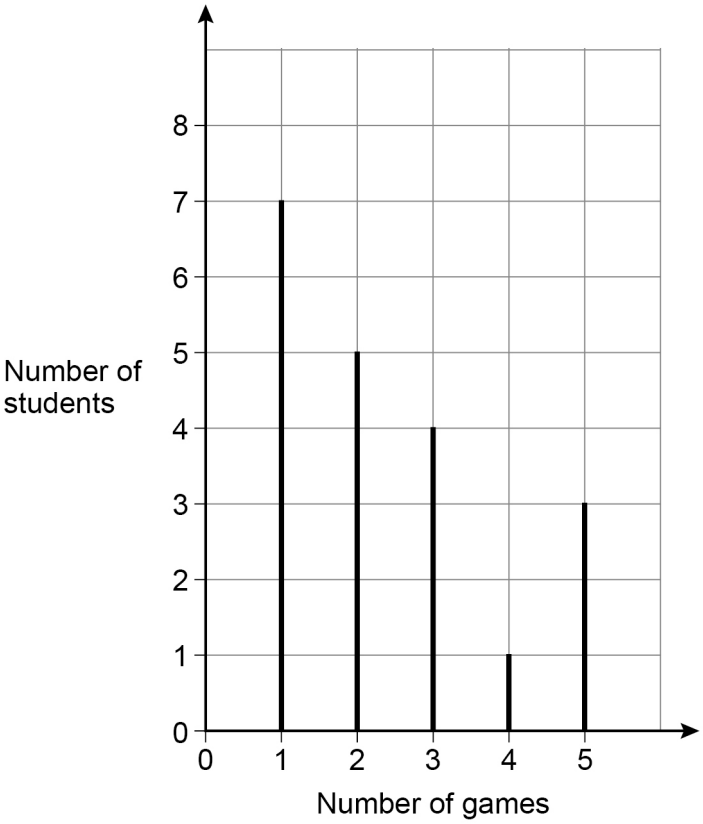
Turn over for the next question

8

Do not write outside the box

14 20 students are asked how many video games they played last month.

The chart shows information about the results.



14 (a) How many students played **more** than 2 games?

[1 mark]

4 + 1 + 3 = 8

Answer 8

Do not write outside the box

14 (b) Work out the mean number of games played.

Give your answer as a decimal.

[3 marks]

mean = $\frac{(1\times7)+(2\times5)+(3\times4)+(4\times1)+(5\times3)}{20}$ (1)

$= \frac{7+10+12+4+15}{20}$ (1) $= \frac{48}{20}$

$= 2.4$

Answer 2.4 (1)

Turn over for the next question

4

Do not write outside the box

15 (a) Work out the multiple of 60 that is closest to 400

[2 marks]

60, 120, 180, 240, 300, 360, 420 (1)

Answer 420 (1)

15 (b) Work out the highest common factor (HCF) of 12 and 18

[2 marks]

12 → 2, 6 → 2, 3

18 → 2, 9 → 3, 3

$\therefore 2^2 \times 3 = 2 \times 3^2$

HCF = $2 \times 3 = 6$

Answer 6 (2)

Do not write outside the box

16 An empty container is a cylinder of radius 3.5 cm and height 40 cm

A tennis ball is a sphere of radius 3.5 cm

Will six of the tennis balls fit in the container?

Tick a box.

Yes ☐ No ☑ (1)

Show working to support your answer.

[2 marks]

diameter of ball = $2 \times 3.5 = 7$ cm

$7 \times 6 = 42$ cm $>$ 40 cm (1)

Turn over for the next question

6

Do not write outside the box

17 (a) Calculate $2^7 \times 5^2$

[1 mark]

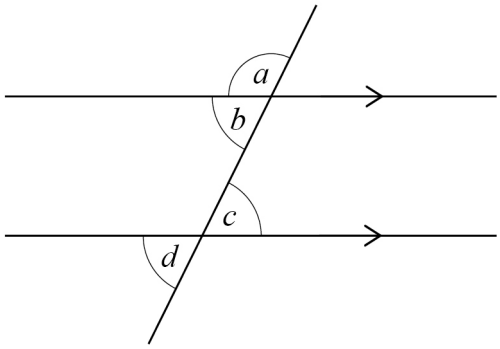
Answer 3200 (1)

17 (b) Calculate $\sqrt[4]{20\,736}$

[1 mark]

Answer 12 (1)

18



Circle the pair of alternate angles.

[1 mark]

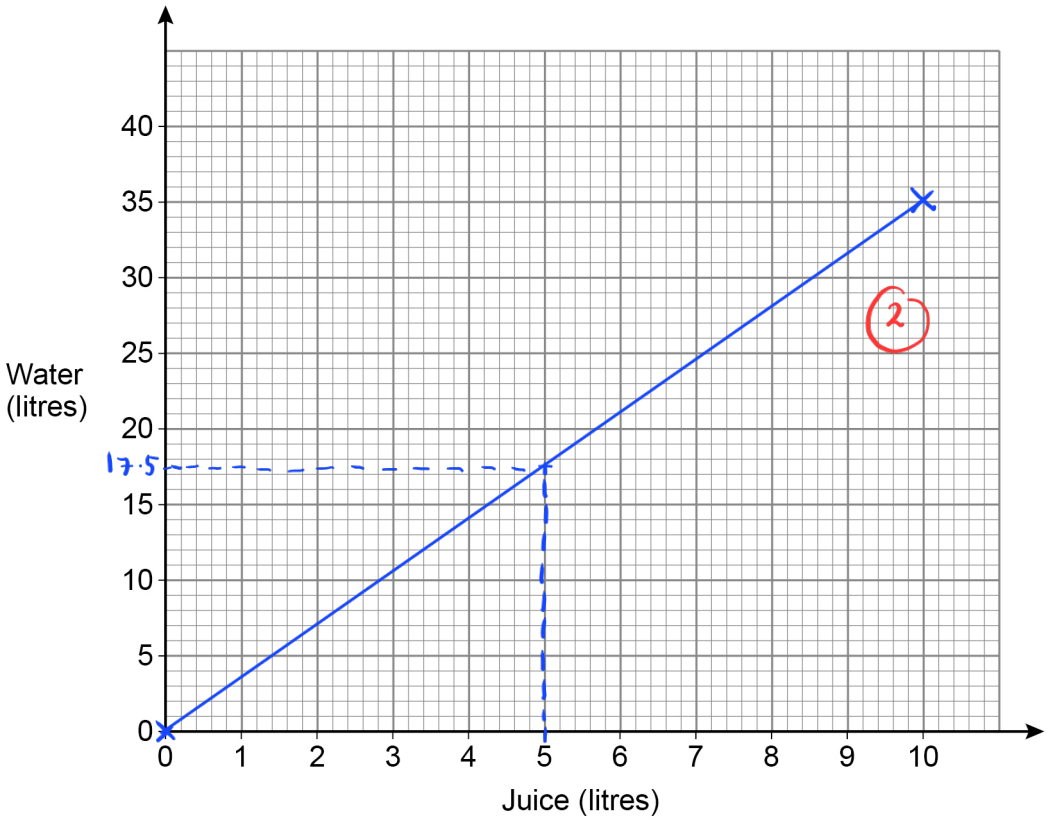
a and b | b and c (1) | c and d | a and d

Do not write outside the box

19 Juice and water are mixed together in the ratio 2 : 7

19 (a) Draw a straight line graph that shows the amounts of juice and water to mix together.
Your graph **must** show up to 10 litres of juice.

[2 marks]



19 (b) How much water needs to be mixed with 5 litres of juice?

[1 mark]

Answer 17·5 (1) litres

6

Turn over ►

Do not write outside the box

20 Adam and Bianca each throw the same biased coin.

Here is some information about their throws.

	Number of throws	**Number of Heads**
Adam	40	14
Bianca	60	20

Bianca says,

"My results give a better estimate of the probability of Heads than Adam's results."

Is she correct?

Tick a box.

Yes ✓ No

Give a reason for your answer. (1)

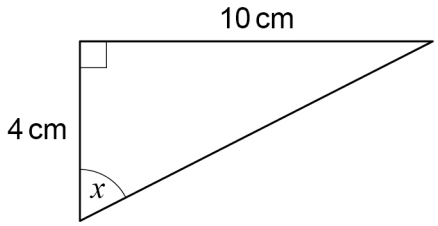
[1 mark]

She throws more than Adam.

Do not write outside the box

21 Use trigonometry to work out the size of angle x.

Not drawn accurately



[3 marks]

$\tan x^\circ = \frac{10}{4}$ (1) (1)

$x^\circ = \tan^{-1} 2.5$

$= 68.1^\circ$ (1)

$x =$ 68.1 °

Turn over for the next question

4

Do not write outside the box

22 Laura works in a shop.

The table shows the number of hours she works on two weekends.

	Saturday	**Sunday**
Weekend 1	3	2
Weekend 2	$5\frac{1}{2}$	$3\frac{1}{2}$

Work out the percentage increase in her **total** hours from Weekend 1 to Weekend 2

[3 marks]

Weekend 1 : 3 + 2 = 5 hours (1)

Weekend 2 : 5.5 + 3.5 = 9 hours

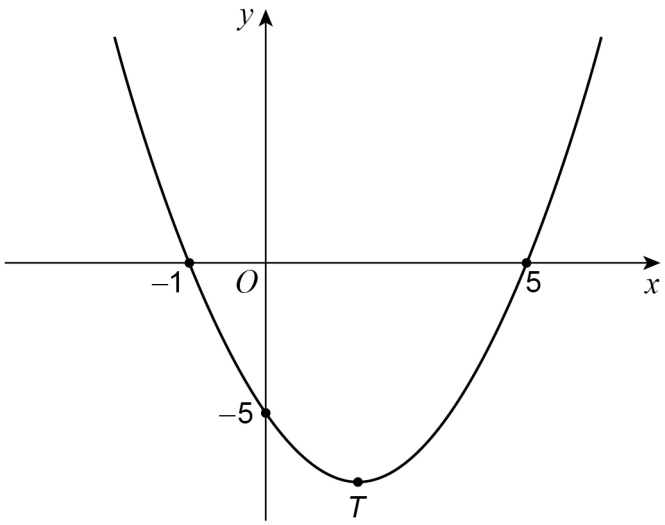
9 hours − 5 hours = 4 hours

% increase = $\frac{4}{5}$ (1) × 100 % = 80 %

Answer 80 (1) %

Do not write outside the box

23 Here is a sketch of the curve $y = x^2 - 4x - 5$



23 (a) Write down the **two** roots of $x^2 - 4x - 5 = 0$

[1 mark]

Answer -1 and 5 (1)

23 (b) Work out the coordinates of *T*, the turning point of the curve.

[2 marks]

$y = (x-2)^2 - 4 - 5$

$y = (x-2) - 9$

(2)

Answer (2 , -9)

6

Do not write outside the box

24 A is an **arithmetic** progression.

Here are the first four terms.

13 16 19 22

G is a **geometric** progression.

Here are the first four terms.

2 4 8 16

nth term of A = 8th term of G

Work out the value of n.

[4 marks]

A : $a = 13$, $d = 3$ (1)

G : $a = 2$, $r = 2$

G : $T_8 = 2 \times 2^7 = 256$ (1)

$256 = 13 + (n-1)3$ (1)

$243 = (n-1)3$

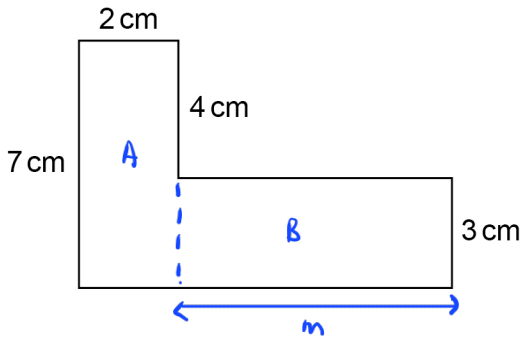
$n - 1 = 81$

$n = 82$ (1)

$n =$ 82

Do not write outside the box

25 The L-shape is made from rectangles.



Not drawn accurately

The area is 44 cm^2

Work out the perimeter.

[3 marks]

Area A = $2 \times 7 = 14$ (1)

Area B = $3 \times m = 3m$

$3m + 14 = 44$

$3m = 30$

$m = 10$ (1)

Perimeter = $2 + 4 + 10 + 3 + 10 + 2 + 7$

$= 38$ (1)

Answer 38 cm

26 Work out $3\begin{pmatrix}1\\6\end{pmatrix} + \begin{pmatrix}2\\5\end{pmatrix}$

[1 mark]

$\begin{bmatrix}3\\18\end{bmatrix} + \begin{bmatrix}2\\5\end{bmatrix} = \begin{bmatrix}5\\23\end{bmatrix}$

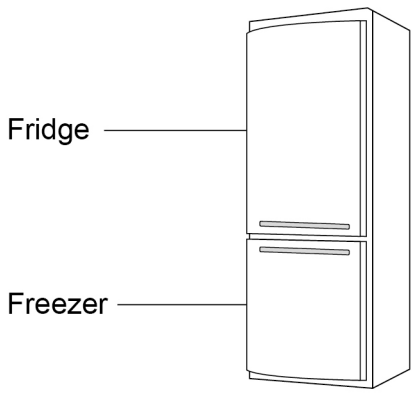
Answer $\begin{pmatrix}5\\23\end{pmatrix}$ (1)

8

Do not write outside the box

27 Information about two fridge-freezers, A and B, is shown.

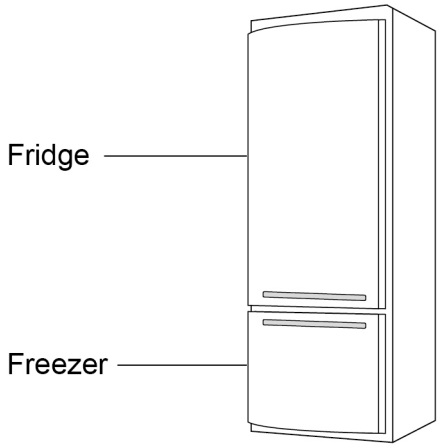
A



Total capacity is 330 litres

fridge capacity : freezer capacity = 3 : 2

B



Fridge capacity is 294 litres

fridge capacity : freezer capacity = 7 : 3

Do not write outside the box

Grace buys one of these fridge-freezers.

She buys the one with the greater **freezer** capacity.

Which one does she buy?

You **must** show your working.

[4 marks]

A : $\frac{2}{3+2} \times 330 = \frac{2}{5} \times 330 = 132$ (1) (1)

B : $\frac{294}{7} \times 3 = 126$ (1)

Grace buys A. (1)

Answer A

Turn over for the next question

4

Do not write outside the box

28 Tom and Adil are the two runners in a 200-metre race.

Tom completes the race in 24 seconds.

Adil completes the race at an average speed of 28.8 kilometres per hour.

Who wins the race?

You **must** show your working.

[3 marks]

Speed in m/s :

Tom $= \frac{200\ m}{24\ s} = 8.33\ ms^{-1}$ (1)

Adil $= \frac{28.8\ km}{1\ hour} \times \frac{1000\ m}{1\ km} \times \frac{1\ hour}{3600\ s}$

$= 8\ ms^{-1}$ (1)

Tom wins. (1)

Answer Tom

Do not write outside the box

29 The mass of a baby is 3.6 kilograms to 1 decimal place.

What is the error interval for the mass in kilograms?

Tick **one** box.

[1 mark]

- ☐ $3.5 \leqslant \text{mass} \leqslant 3.6$
- ☐ $3.55 \leqslant \text{mass} \leqslant 3.65$
- ☐ $3.5 \leqslant \text{mass} < 3.6$
- ☑ $3.55 \leqslant \text{mass} < 3.65$

1

END OF QUESTIONS

4

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ANSWER IN THE SPACES PROVIDED

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