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

Foundation Tier   Paper 3 Calculator

F

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.
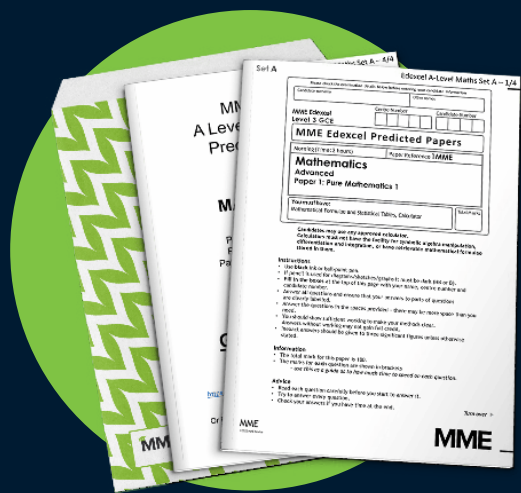
Advice

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	

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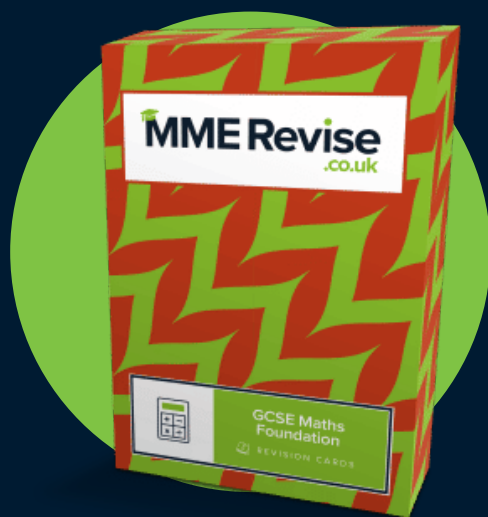# MME.

GCSE Maths Predicted Papers 2024
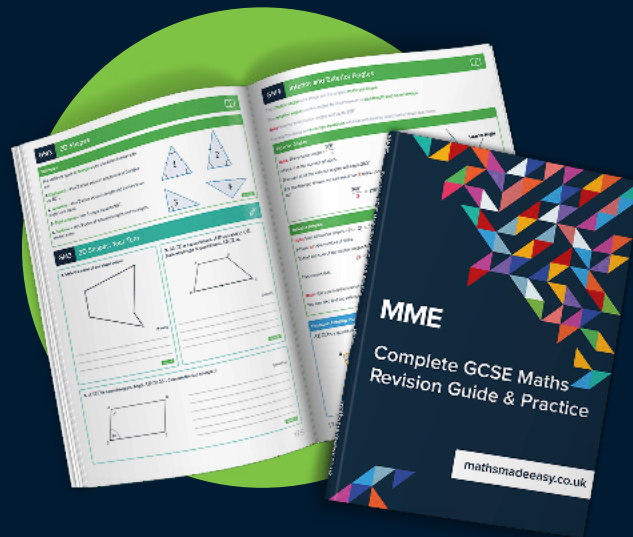
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Answer **all** questions in the spaces provided.

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]

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

4 (b) Simplify $4 \times 2c$

Circle your answer.

[1 mark]

$42c$ $\qquad$ $16c$ $\qquad$ $(8c)$ $\qquad$ $6c$

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
Mass of a pound coin	grams

Turn over for the next question

6

Turn over ▶

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]

$1h = 1 \times 60 = 60$ mins

$1h\ 30m = 60 + 30 = 90$ mins

Total $= 20 + 40 + 90 = 150$ mins

$150 \div 60 = 2.5$ h

Answer _____ 2.5 _____ hours

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]

8 rulers cost $8 \times 60 = 480p = £4.80$

$10 - 4.8 = £5.20$ remaining

$£5.20 = 520p$

$520 \div 20 = 26$ pens

Answer _____ 26 _____

5

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

Key
- Gold
- Silver
- Bronze

Number of medals

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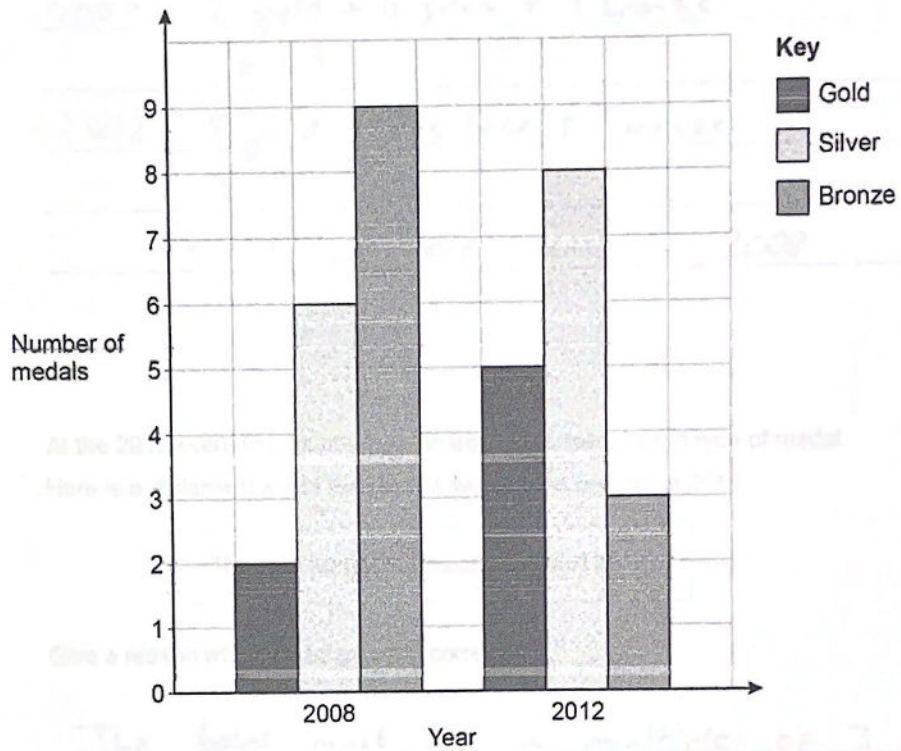
7 (a) Complete this statement about the medals won by the country in 2008

[1 mark]

number of Silver medals = _____3_____ × number of Gold medals

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

[2 marks]

2008 : 2 gold + 6 silver + 9 bronze
= 17

2012 : 5 gold + 8 silver + 3 bronze
= 16

17 > 16 So more medals in 2008

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]

The total must be a multiple of 3 and
25 is not.

Turn over for the next question

4

Turn over ▶

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 $= 5.6 \div 7 = 0.8$ L

Total $= 5.6 + 0.8 = 6.4$ L

Difference $= 6.4 - 6 = 0.4$ L

$0.4 \times 1000 = 400$ ml

Answer   400   ml

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]

| Total number of students | Exercise taken | Time exercising |

At least 1 hour — 27

35

Yes

Less than 1 hour — 8

58

No

23

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?
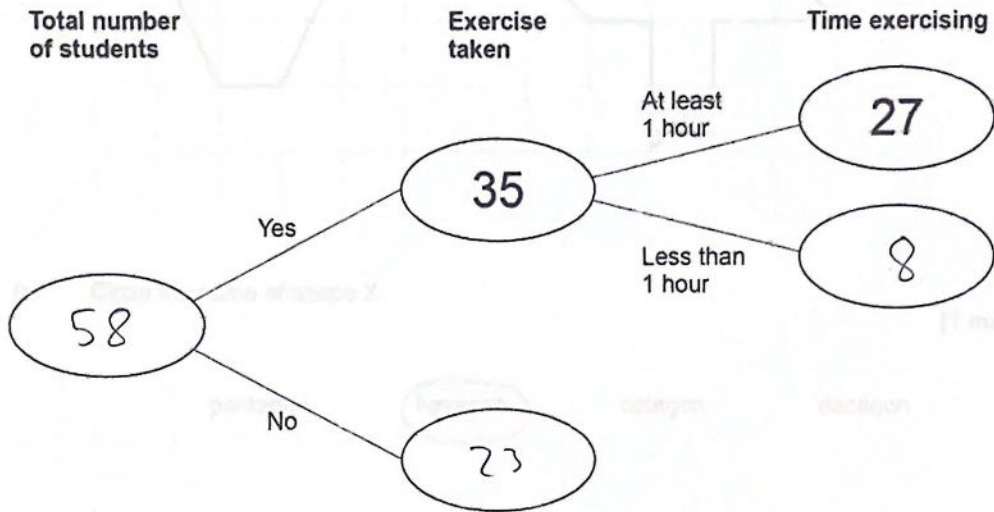
[1 mark]

$$\frac{27}{35}$$

Answer _____

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

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

[1 mark]

The sides are not of equal length.

_____

10 (c) Complete these statements.

[2 marks]

The number of lines of symmetry of shape **X** is ___2___
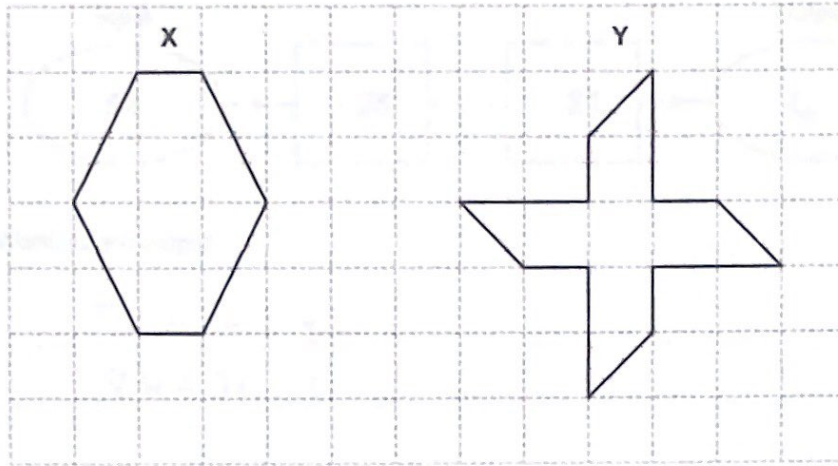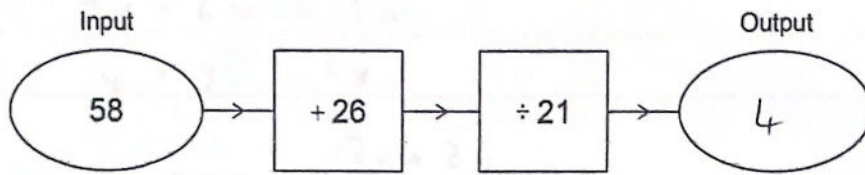
The order of rotational symmetry of shape **Y** is ___4___

11 (a) Here is a number machine.

Input

58 → + 26 → ÷ 21 → Output 4

Work out the output.

[1 mark]

$58 + 26 = 84$

$84 \div 21 = 4$

Answer _____4_____

11 (b) Here is a different number machine.

Input

c → × 3 → − 5 → Output d
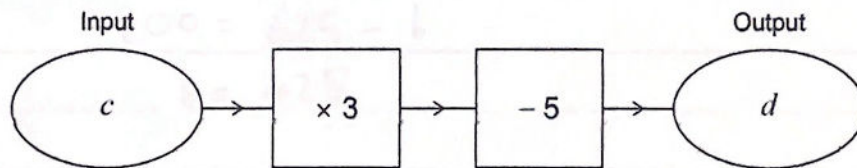
Work out a formula for d in terms of c.

[2 marks]

$c \times 3 = 3c \rightarrow -5 = 3c - 5 = d$

Answer _____$d = 3c - 5$_____

7

Turn over ▶

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

[2 marks]

$9x - 6x = 3x$

$y + y = 2y$

Answer $\qquad 3x + 2y$

12 (b) Here are two expressions.

$8a$ $\qquad$ $a^2 - b$

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

Work out the value of b.

[3 marks]

$8a = a^2 - b$

$8 \times 25 = 25^2 - b$

$200 = 625 - b$

$b = 425$

$b = \qquad 425$

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12 (c) Simplify $\dfrac{6w+10}{2}$

Circle your answer.

[1 mark]

$6w + 8$ $\qquad$ $3w + 10$ $\qquad$ $6w + 5$ $\qquad$ $\boxed{3w + 5}$

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]

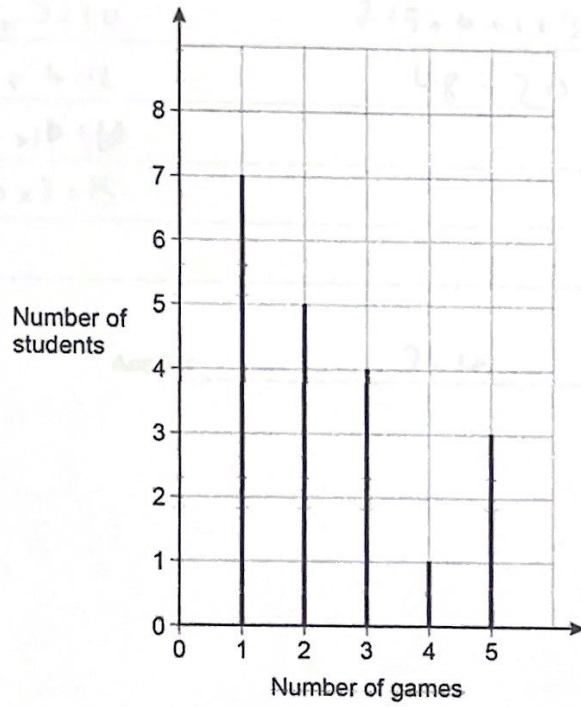|	True	False	Cannot tell
There are more green discs than blue discs.	✓		
In total there are 31 discs.			✓

Turn over for the next question

8

Turn over ▶

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

The chart shows information about the results.

Number of students

Number of games

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

[1 mark]

4 + 1 + 3 = 8

Answer _____ 8 _____

Turn over for the next question

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

Give your answer as a decimal.

[3 marks]

$1 \times 7 = 7$ $7 + 10 + 12 + 4 + 15 = 48$

$2 \times 5 = 10$ $7 + 5 + 4 + 1 + 3 = 20$

$3 \times 4 = 12$ $48 \div 20 = 2.4$

$4 \times 1 = 4$

$5 \times 3 = 15$

Answer   2.4

Turn over for the next question

4

Turn over ▶

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

[2 marks]

60   120   180   240   300   360   420   480

40 less   20 more

420 is closest

Answer _____ 420 _____

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

[2 marks]

$12 = 2 \times 2 \times 3$

$18 = 2 \times 3 \times 3$

12   18

2   2   3
          3

HCF = 2×3
= 6

Answer _____ 6 _____

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 ☑

Show working to support your answer.

[2 marks]

Each tennis ball is 2 × 3.5 = 7 cm tall.

7 × 6 = 42 cm > 40 cm

No, 6 tennis balls will not fit.

Turn over for the next question

6

Turn over ▶

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

[1 mark]

Answer _____3200_____

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

[1 mark]

Answer _____12_____

18
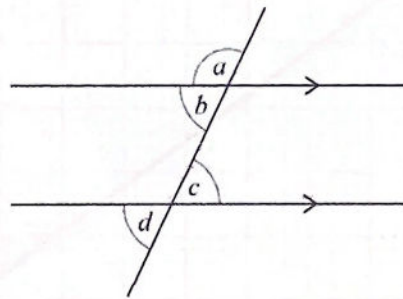
Circle the pair of alternate angles.

[1 mark]

a and b (b and c) c and d a and d

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]

Water
(litres)

Juice (litres)

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

[1 mark]

Answer _____17.5_____ litres

6

Turn over ▶

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 mark]
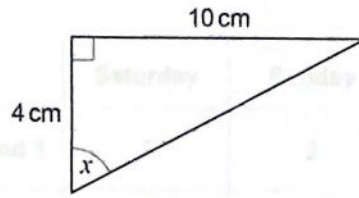
More throws gives a larger sample.

Do not write outside the box

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

10 cm

Not drawn accurately

4 cm

x

[3 marks]

$\tan(x) = \dfrac{10}{4}$

$\tan(x) = 2.5$

$x = 68.1°$

$x = $ _____ 68.1 _____ °

Turn over for the next question

4

Turn over ▶

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 : $3 + 2 = 5$ hr
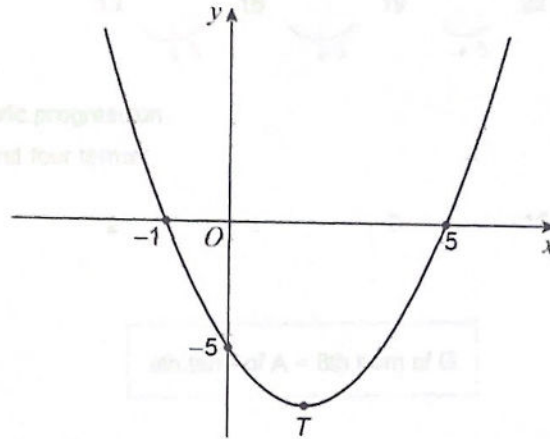
Weekend 2 : $5\frac{1}{2} + 3\frac{1}{2} = 9$ hr

$\% \uparrow = \frac{9-5}{5} \times 100 = 80\%$

Answer _____ 80 _____ %

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 _____

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

[2 marks]

$x = 2$ halfway between the roots

$y = 2^2 - 4 \times 2 - 5 = 4 - 8 - 5 = -9$

Answer (_____ 2 _____ , _____ −9 _____)

Turn over ▶

6

24

A is an **arithmetic** progression.

Here are the first four terms.

$$13 \quad 16 \quad 19 \quad 22$$

$+3 \quad +3 \quad +3$

G is a **geometric** progression.

Here are the first four terms.

$$2 \quad 4 \quad 8 \quad 16$$

| nth term of A = 8th term of G |

Work out the value of n.

[4 marks]

$$2 \quad 4 \quad 8 \quad 16 \quad 32 \quad 64 \quad 128 \quad 256$$

nth term of A = 256

A has difference of 3 so is 3n+k

$3(1) + k = 13 \qquad 3 + k = 13 \qquad k = 10$

A is $3n + 10$

$3n + 10 = 256$

$3n = 246$

$n = 82$

$n = \underline{\qquad 82 \qquad}$

25 The L-shape is made from rectangles.

2 cm

4 cm

7 cm

$x-2$ 10

3 cm

x 12

Not drawn accurately
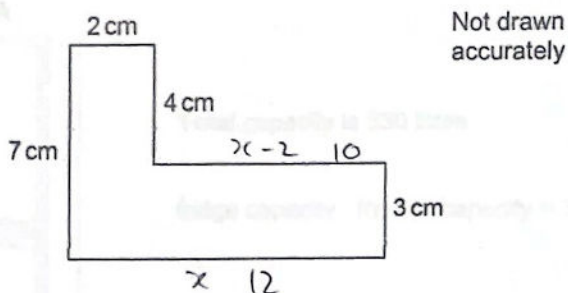
The area is 44 cm^2

Work out the perimeter.

[3 marks]

$7x - 4(x-2) = 44$

$7x - 4x + 8 = 44$

$3x + 8 = 44$

$3x = 36$

$x = 12$

$7 + 12 + 3 + 10 + 4 + 2 =$

38 cm

Answer _____ 38 _____ cm

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

[1 mark]

$3\begin{pmatrix} 1 \\ 6 \end{pmatrix} + \begin{pmatrix} 2 \\ 5 \end{pmatrix} = \begin{pmatrix} 3 \\ 18 \end{pmatrix} + \begin{pmatrix} 2 \\ 5 \end{pmatrix} = \begin{pmatrix} 5 \\ 23 \end{pmatrix}$
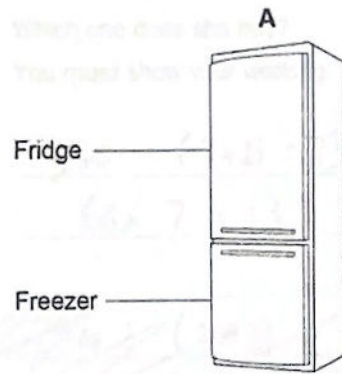
Answer $\begin{pmatrix} 5 \\ 23 \end{pmatrix}$

8

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

A

Fridge ——————

Freezer ——————

Total capacity is 330 litres

fridge capacity : freezer capacity = 3 : 2

B
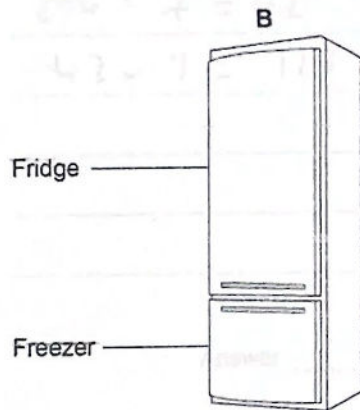
Fridge ——————

Freezer ——————

Fridge capacity is 294 litres

fridge capacity : freezer capacity = 7 : 3

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) $330 \div (3+2) = 330 \div 5 = 66$

$66 \times 2 = 132$ L freezer

B: ~~$294 \div (7+3) = 29 \; 4$~~

~~$29 \; 4 \times 3 =$~~

B: $294 \div 7 = 42$

$42 \times 3 = 126$ L freezer

Answer _____ A is larger _____

Turn over for the next question

4

Turn over ▶

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]

$28.8 \text{ km/h} = 28.8 \times 1000 = 28800 \text{ m/h}$

$28800 \div 3600 = 8 \text{ m/s}$

$200 \div 8 = 25 \text{ seconds} \quad > 24$

Tom wins

Answer   Tom

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]

☐ $3.5 \leqslant$ mass $\leqslant 3.6$

☑ $3.55 \leqslant$ mass $\leqslant 3.65$

☐ $3.5 \leqslant$ mass < 3.6

☑ $3.55 \leqslant$ mass < 3.65

END OF QUESTIONS

4