

Please write clearly in block capitals.

Surname \_\_\_\_\_

Forename(s) \_\_\_\_\_

Candidate signature \_\_\_\_\_

I declare this is my own work.

# GCSE MATHEMATICS

# F

Foundation Tier

Paper 3 Calculator

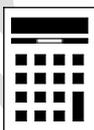
Shadow based on June 2022 question paper

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	
<b>TOTAL</b>	

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

**1** What is  $\frac{3}{4}$  as a percentage?

Circle your answer.

**[1 mark]**

10%

25%

40%

75%

**2** Circle the number that is a factor of 12

**[1 mark]**

8

7

6

5

**3** Circle the value of the digit 9 in 0.091

**[1 mark]**

$\frac{9}{100}$

$\frac{9}{10}$

$\frac{1}{900}$

$\frac{1}{90}$

- 4 Simplify  $5 \times 3e$   
Circle your answer.

[1 mark]

$53e$

$15e$

$125e$

$8e$

- 5 (a) Write a suitable unit for measuring each amount.  
One has been done for you.

[2 marks]

	Unit
Length of a pencil	centimetres
Mass of a bag of potatoes	
Distance from Bristol to Portsmouth	

Turn over for the next question

Turn over ►

5 (b) Times for the three acts of a play are

- 40 minutes
- 50 minutes
- 1 hour 30 minutes.

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

Give your answer in hours.

[2 marks]

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Answer \_\_\_\_\_ hours

6

Boxes of plums cost £2 each.

Boxes of tomatoes cost 80p each.

Lucy buys some boxes of plums and some boxes of tomatoes.

She buys 4 boxes of plums.

The total cost is £20

How many boxes of tomatoes does she buy?

**[3 marks]**

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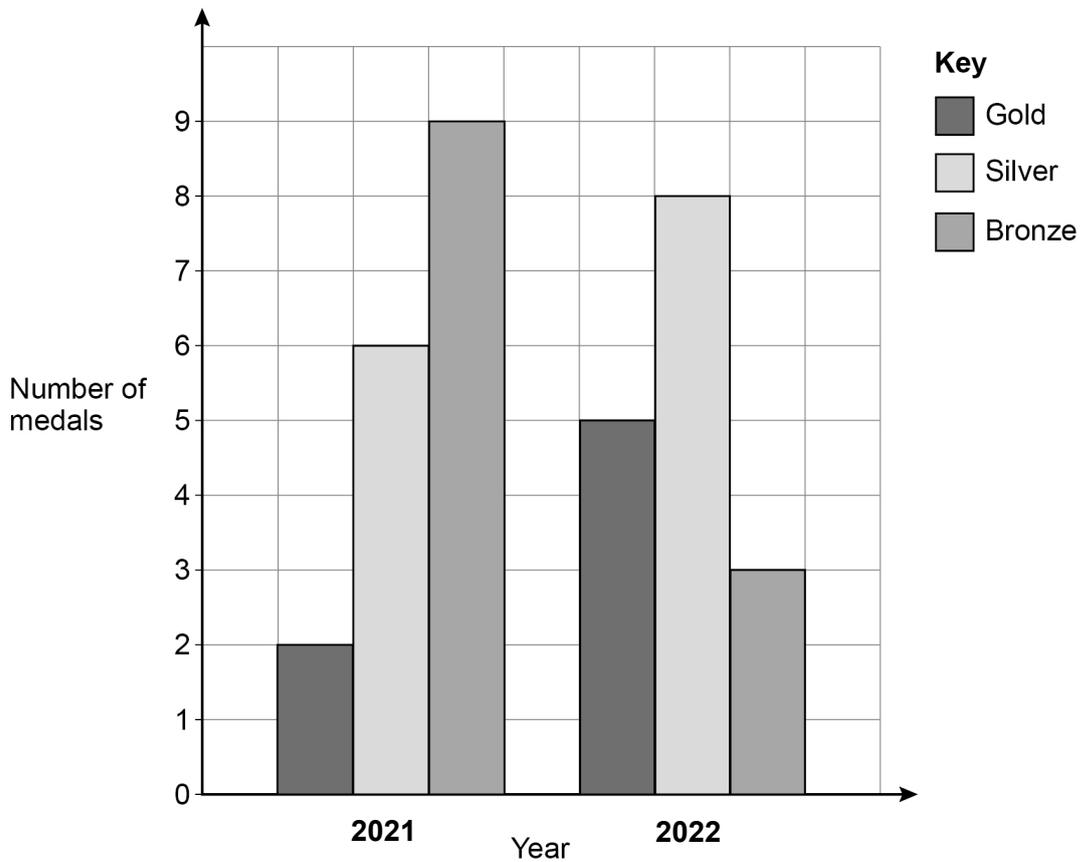
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Answer \_\_\_\_\_

**Turn over for the next question****Turn over ►**

- 7 The bar chart shows the number of medals won by a dog breeder at dog shows in 2021 and 2022



- 7 (a) Complete this statement about the medals won by the dog breeder in 2021

[1 mark]

number of Silver medals = \_\_\_\_\_ × number of Gold medals

7 (b) Show that the dog breeder won **fewer** medals in 2022 than in 2021

[2 marks]

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7 (c) At the 2019 event the dog breeder won an **equal** number of each type of medal.  
Here is a statement about the medals won by the dog breeder in 2019

The total number of medals **cannot** be 24

Give a reason why the statement is incorrect.

[1 mark]

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**Turn over for the next question**

8 In this question use 1 litre = 1000 millilitres

A mixture is made using blue paint and yellow paint.

$$\text{amount of blue paint} = \text{amount of yellow paint} \div 8$$

7.2 litres of yellow paint will make **more** than 8 litres of the **mixture**.

How much more?

Give your answer in millilitres.

[4 marks]

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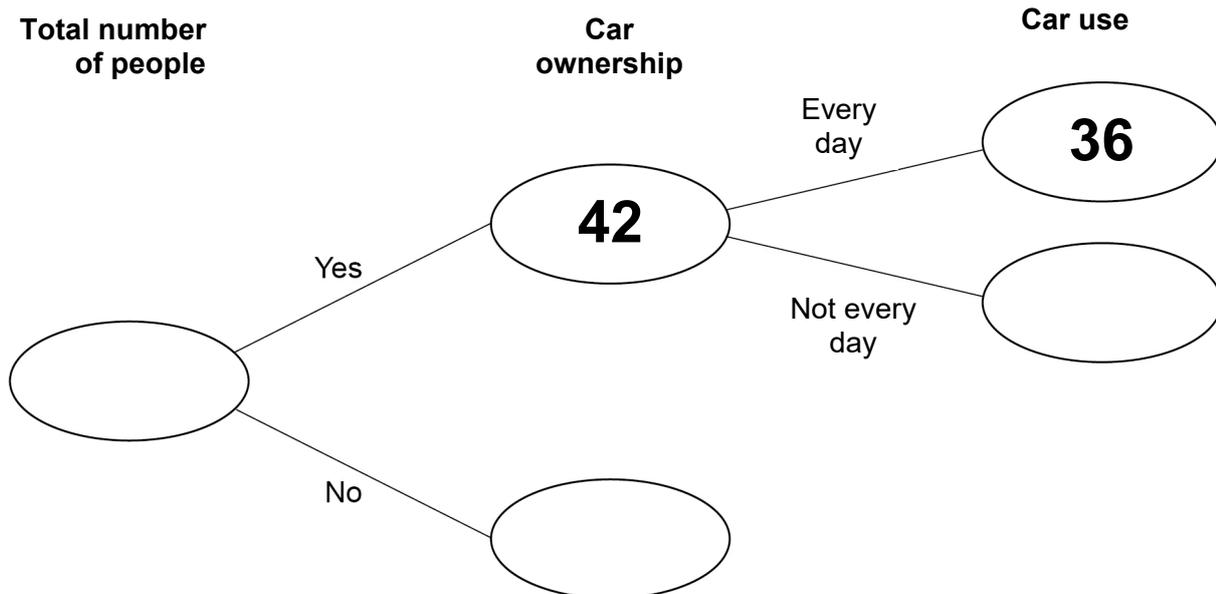
Answer \_\_\_\_\_ ml

9 Some people were asked if they owned a car.

9 (a) 11 more people answered Yes than answered No.

Complete the frequency tree.

[3 marks]



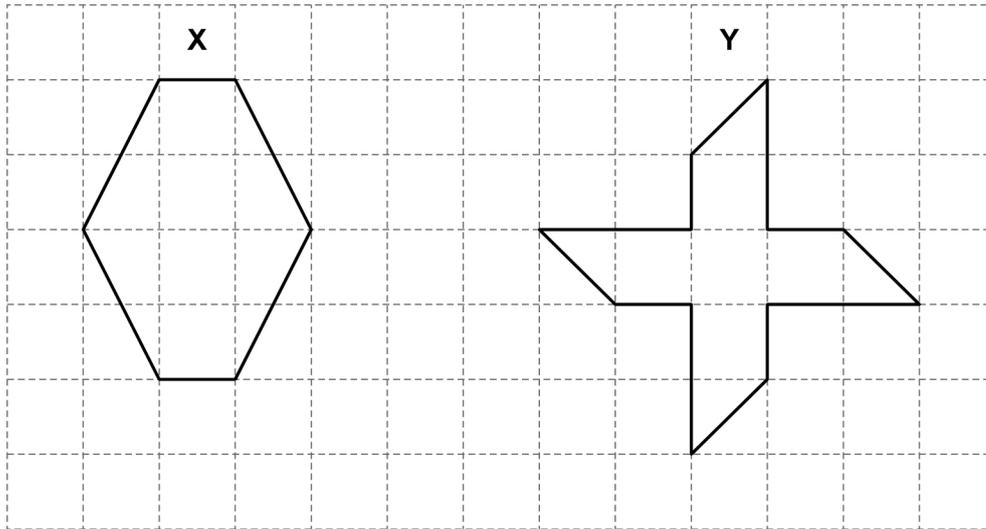
9 (b) One of the 42 people who answered Yes is chosen at random.

What is the probability that they use their car every day?

[1 mark]

Answer \_\_\_\_\_

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



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

[1 mark]

pentagon

hexagon

septagon

octagon

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

[1 mark]

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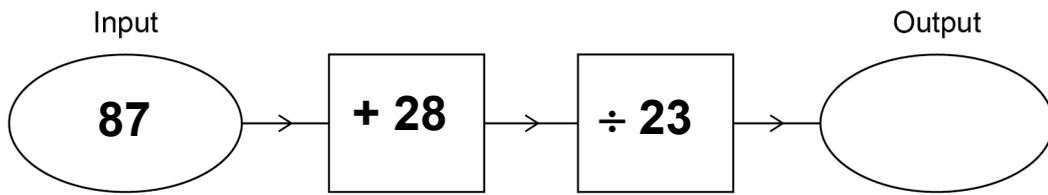
10 (c) Complete these statements.

[2 marks]

The order of rotational symmetry of shape **X** is \_\_\_\_\_

The number of lines of symmetry of shape **Y** is \_\_\_\_\_

11 (a) Here is a number machine.



Work out the output.

[1 mark]

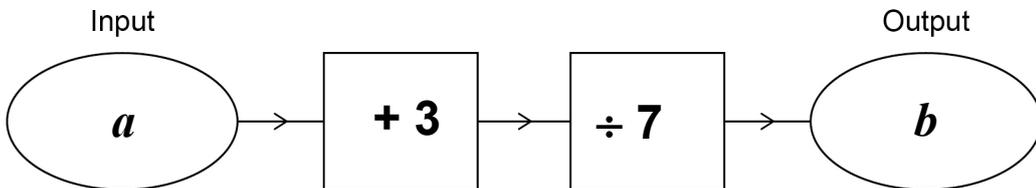
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Answer \_\_\_\_\_

11 (b) Here is a different number machine.



Work out a formula for  $b$  in terms of  $a$ .

[2 marks]

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Answer \_\_\_\_\_

7

Turn over ►

12 (a) Simplify fully  $8x + 2y - 5x + 3y$

[2 marks]

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Answer \_\_\_\_\_

12 (b) Here are two expressions.

$$12a$$

$$a^2 - b$$

When  $a = 20$  the expressions have the same value.

Work out the value of  $b$ .

[3 marks]

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$b =$  \_\_\_\_\_

12 (c) Simplify  $\frac{8p+12}{2}$

Circle your answer.

[1 mark]

$8p + 10$

$4p + 12$

$8p + 6$

$4p + 6$

13 On a farm,

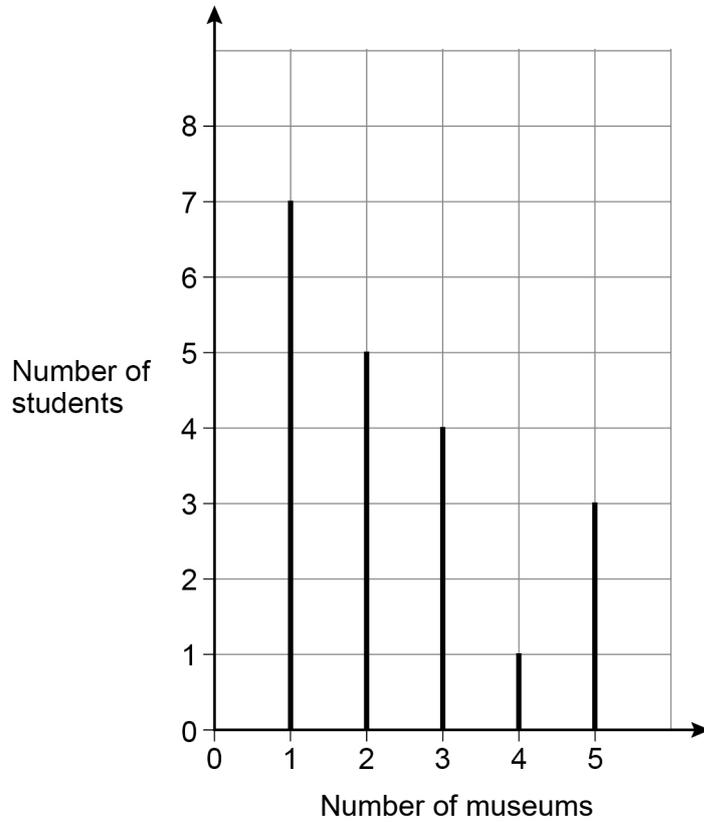
number of cows : number of goats = 30 : 17

Tick **one** box for each statement about the animals on the farm.

[2 marks]

	True	False	Cannot tell
There are more goats than cows.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In total there are 47 animals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- 14** 20 students are asked how many museums they visited last year.  
The chart shows information about the results.



- 14 (a)** How many students visited **less** than 3 museums?

[1 mark]

Answer \_\_\_\_\_

- 14 (b)** Work out the mean number of museums visited.  
Give your answer as a decimal.

**[3 marks]**

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Answer \_\_\_\_\_

**Turn over for the next question**

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4

**Turn over ►**

**15 (a)** Work out the multiple of 30 that is closest to 500

**[2 marks]**

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Answer \_\_\_\_\_

**15 (b)** Work out the highest common factor (HCF) of 12 and 21

**[2 marks]**

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Answer \_\_\_\_\_

16

An empty container is a cylinder of radius 0.65 cm and height 16 cm

A ball bearing is a sphere and has a radius of 0.65 cm

Will 12 of the ball bearings fit in the container?

Tick a box.

Yes

No

Show working to support your answer.

**[2 marks]**

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**Turn over for the next question**

**Turn over ►**

17 (a) Calculate  $5^7 \times 3^2$

[1 mark]

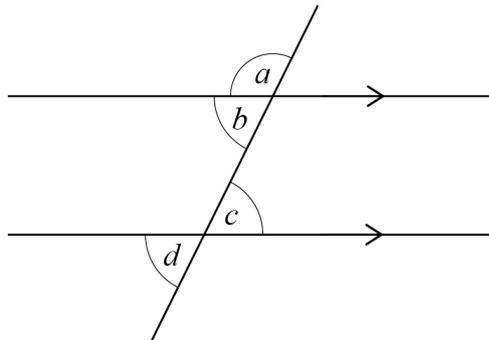
Answer \_\_\_\_\_

17 (b) Calculate  $\sqrt[4]{65536}$

[1 mark]

Answer \_\_\_\_\_

18



Circle the pair of corresponding angles.

[1 mark]

*a* and *b*

*b* and *c*

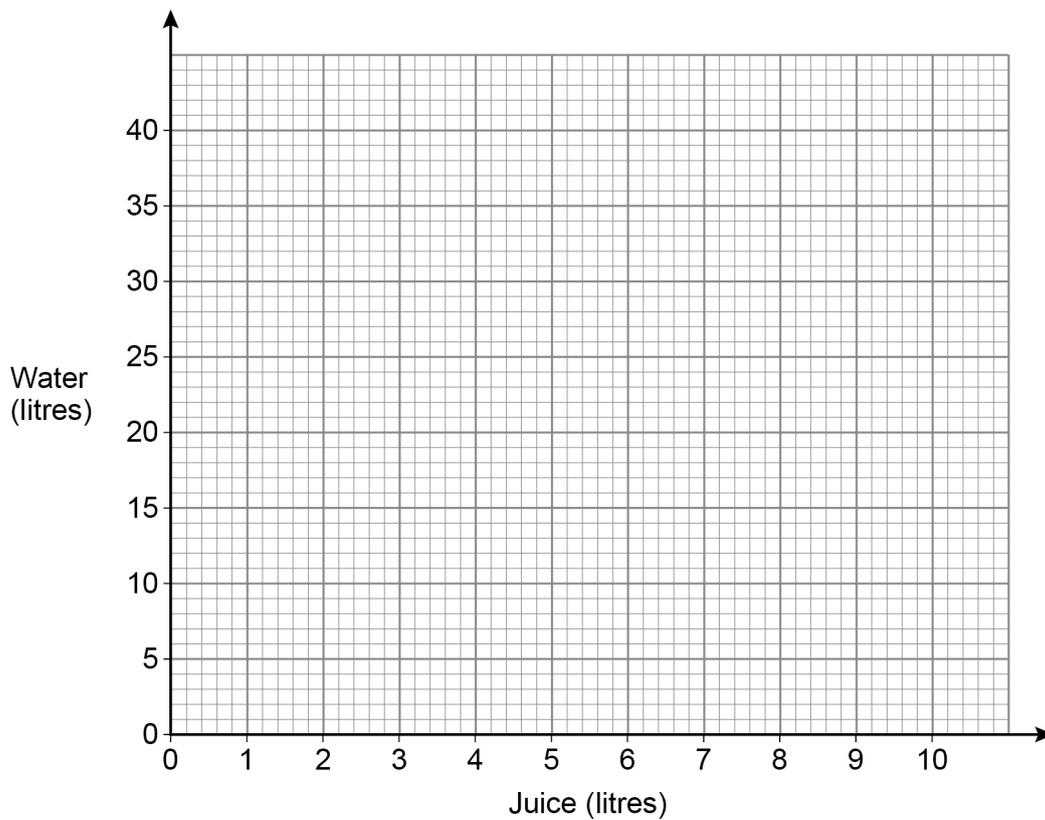
*c* and *d*

*b* and *d*

**19** Juice and water are mixed together in the ratio 4 : 9

**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 6 litres of juice?

**[1 mark]**

Answer \_\_\_\_\_ litres

6
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**Turn over ►**

20

Aaron and Bryony each throw the same biased coin.

Here is some information about their throws.

	Number of throws	Number of Heads
Aaron	60	20
Bryony	50	17

Bryony says,

“My results give a better estimate of the probability of Heads than Aaron’s results.”

Is she correct?

Tick a box.

Yes

No

Give a reason for your answer.

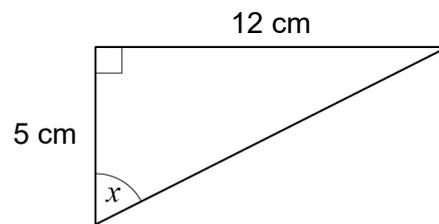
[1 mark]

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21

Use trigonometry to work out the size of angle  $x$ .Not drawn  
accurately**[3 marks]**

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$$x = \underline{\hspace{10em}}^\circ$$

**Turn over for the next question****Turn over ►**

22

Lisa works two days part-time in a shop each month.

The table shows the number of hours she works on Monday and Tuesday in May and June.

	Monday	Tuesday
May	2	3
June	$4\frac{1}{4}$	$3\frac{3}{4}$

Work out the percentage increase in her **total** hours from May to June.

[3 marks]

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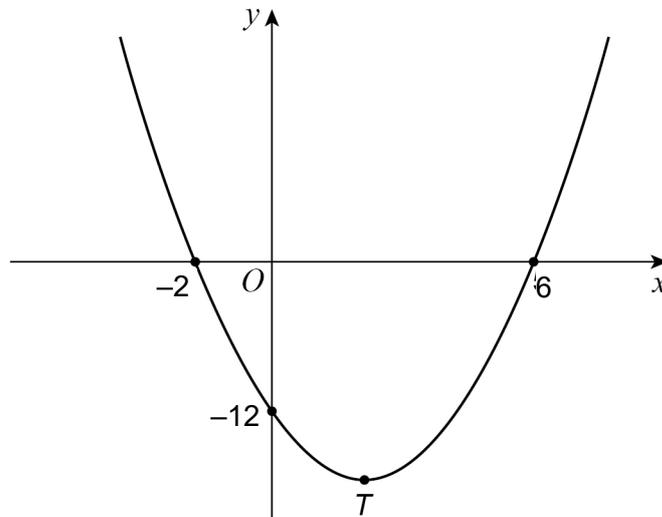
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Answer \_\_\_\_\_ %

23 Here is a sketch of the curve  $y = x^2 - 4x - 12$



23 (a) Write down the **two** roots of  $x^2 - 4x - 12 = 0$

[1 mark]

Answer \_\_\_\_\_ and \_\_\_\_\_

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

[2 marks]

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Answer ( \_\_\_\_\_ , \_\_\_\_\_ )

24

A is an **arithmetic** progression.

Here are the first four terms.

11            14            17            20

G is a **geometric** progression.

Here are the first four terms.

4            8            16            32

 $n$ th term of A = 8th term of GWork out the value of  $n$ .**[4 marks]**

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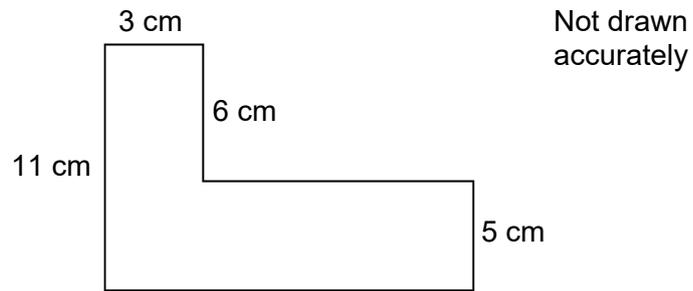
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 $n =$  \_\_\_\_\_

- 25 The L-shape is made from rectangles.



The area is  $88 \text{ cm}^2$

Work out the perimeter.

[3 marks]

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Answer \_\_\_\_\_ cm

- 26 Work out  $3 \begin{pmatrix} 2 \\ 5 \end{pmatrix} - \begin{pmatrix} 5 \\ 8 \end{pmatrix}$

[1 mark]

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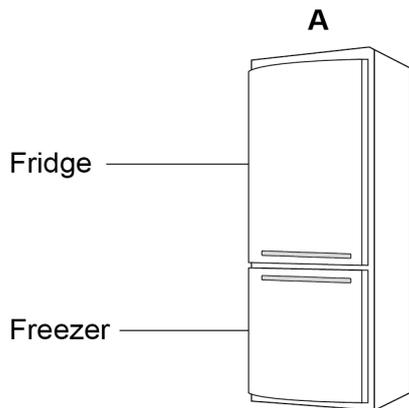


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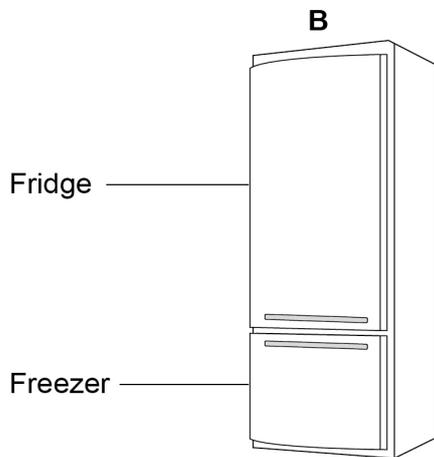
Answer  $\left( \begin{array}{c} \phantom{0} \\ \phantom{0} \end{array} \right)$

27

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

**Total** capacity is 380 litres

fridge capacity : freezer capacity = 3 : 2

**Freezer** capacity is 99 litres

fridge capacity : freezer capacity = 7 : 3



28

Tracey and Anita are the two runners in a 400-metre race.

Tracey completes the race in 52 seconds.

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

Who wins the race?

You **must** show your working.

**[3 marks]**

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Answer \_\_\_\_\_

29

The mass of a baby elephant is 120.4 kilograms to 1 decimal place.

What is the error interval for the mass in kilograms?

Tick **one** box.

[1 mark]

$$120.3 \leq \text{mass} \leq 120.5$$

$$120.35 \leq \text{mass} \leq 120.45$$

$$120.3 \leq \text{mass} < 120.5$$

$$120.35 \leq \text{mass} < 120.45$$

**END OF QUESTIONS**

**There are no questions printed on this page**

*Do not write  
outside the  
box*

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ANSWER IN THE SPACES PROVIDED**

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