

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

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Forename(s)

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Candidate signature

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I declare this is my own work.

# GCSE MATHEMATICS

# F

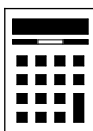
Foundation Tier      Paper 3 Calculator

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	
<b>TOTAL</b>	



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]

$\frac{9}{100}$

$\frac{9}{10}$

$\frac{1}{90}$

$\frac{1}{9}$



- 4 Simplify  $4 \times 2c$   
Circle your answer.

[1 mark]

$42c$

$16c$

$8c$

$6c$

- 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	
Mass of a pound coin	

Turn over for the next question

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]

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Answer \_\_\_\_\_ 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]**

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Answer \_\_\_\_\_

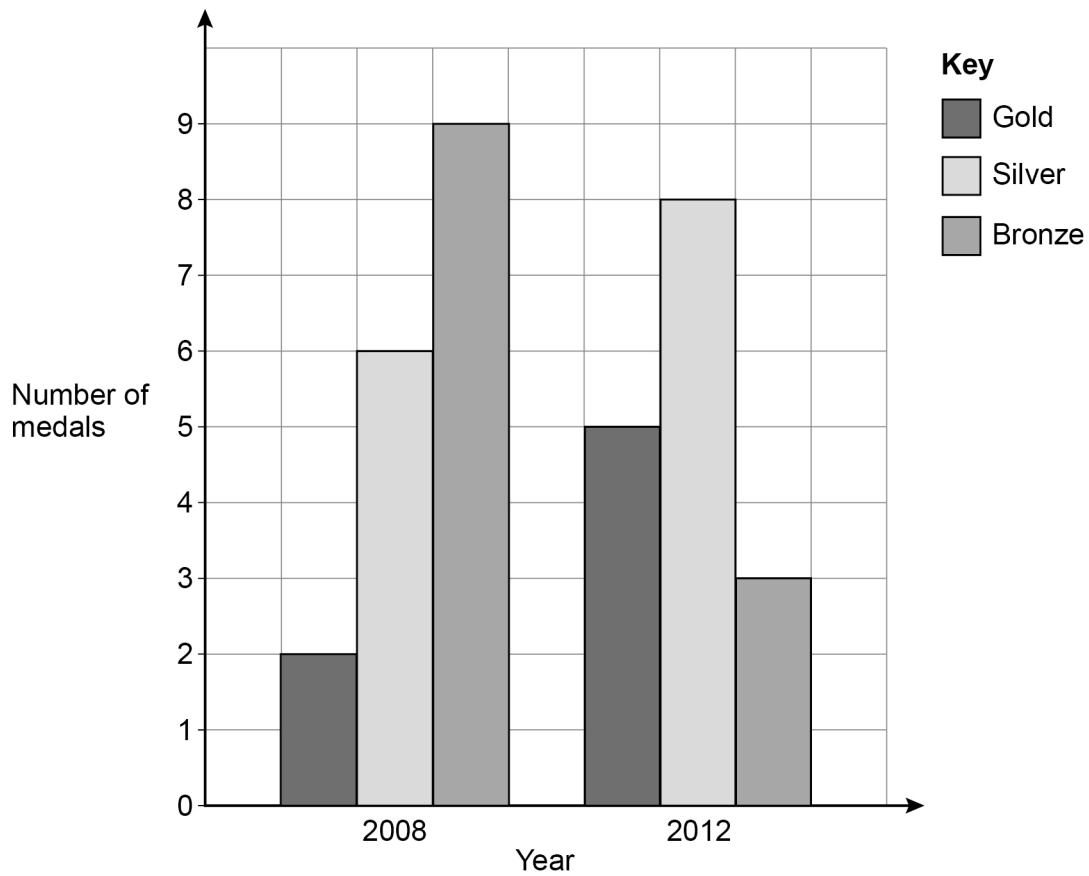
**Turn over for the next question**

5
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**Turn over ►**



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 = \_\_\_\_\_ × number of Gold medals



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

[2 marks]

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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]

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Turn over for the next question



8 In this question use 1 litre = 1000 millilitres

A mixture is made using white paint and red paint.

$$\text{amount of white paint} = \text{amount of red paint} \div 7$$

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]

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

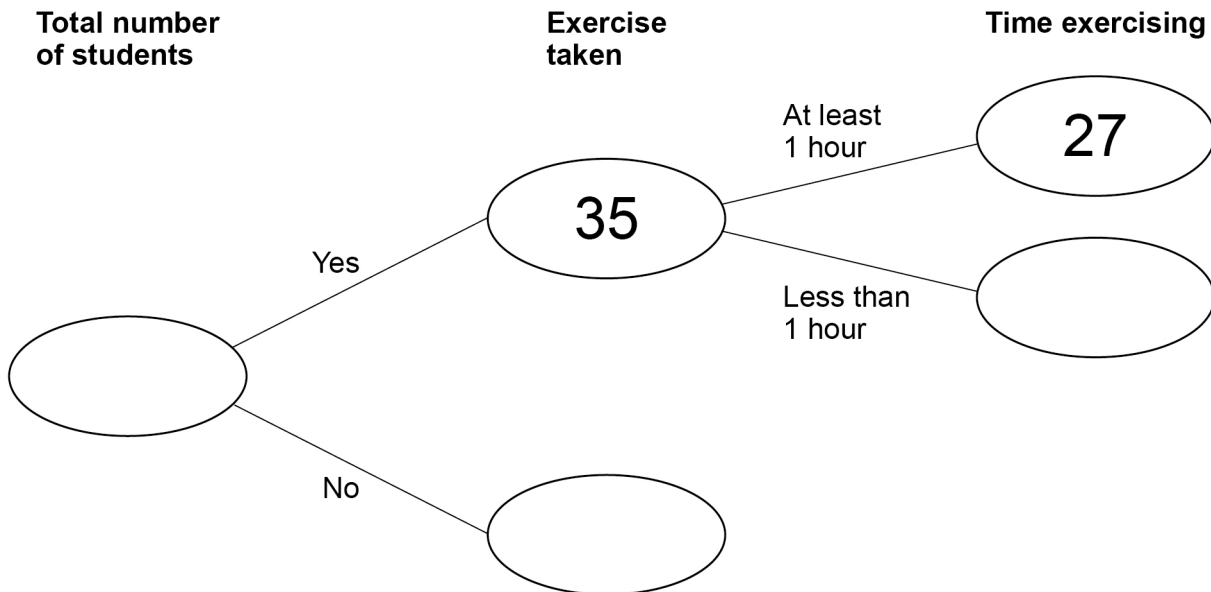


9 Some students were asked about their daily exercise.

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

Complete the frequency tree.

[3 marks]



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

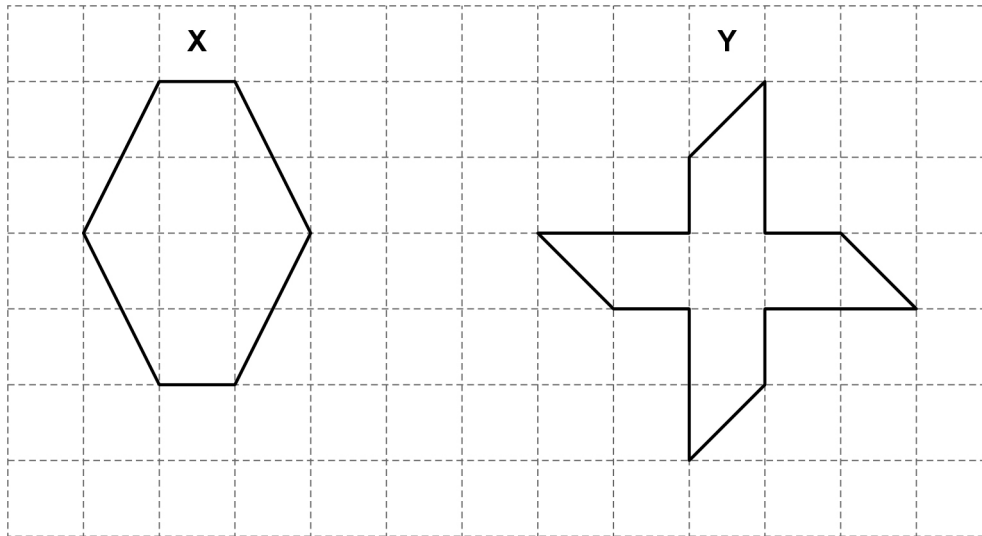
What is the probability that they exercise for at least 1 hour?

[1 mark]

Answer \_\_\_\_\_



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]

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10 (c) Complete these statements.

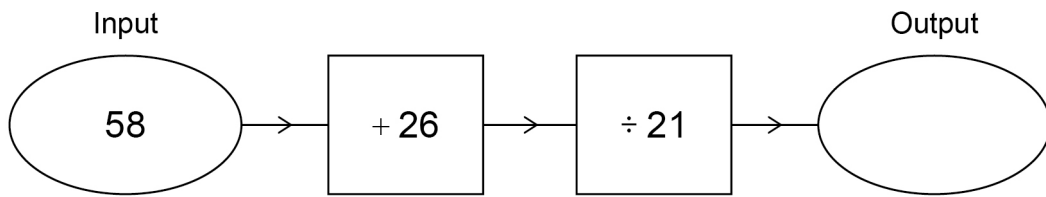
[2 marks]

The number of lines of symmetry of shape X is \_\_\_\_\_

The order of rotational symmetry of shape Y is \_\_\_\_\_



11 (a) Here is a number machine.



Work out the output.

[1 mark]

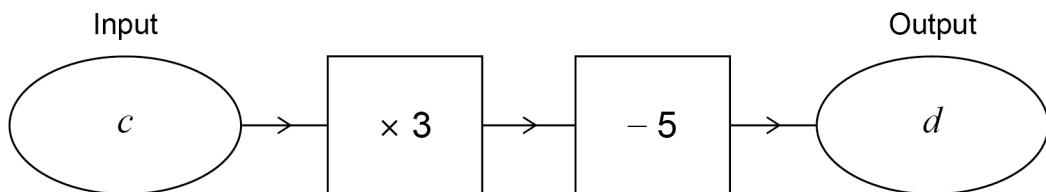
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Answer \_\_\_\_\_

11 (b) Here is a different number machine.



Work out a formula for  $d$  in terms of  $c$ .

[2 marks]

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Answer \_\_\_\_\_

7
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Turn over ►



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

[2 marks]

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Answer \_\_\_\_\_

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]

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



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

Circle your answer.

[1 mark]

$6w + 8$

$3w + 10$

$6w + 5$

$3w + 5$

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]

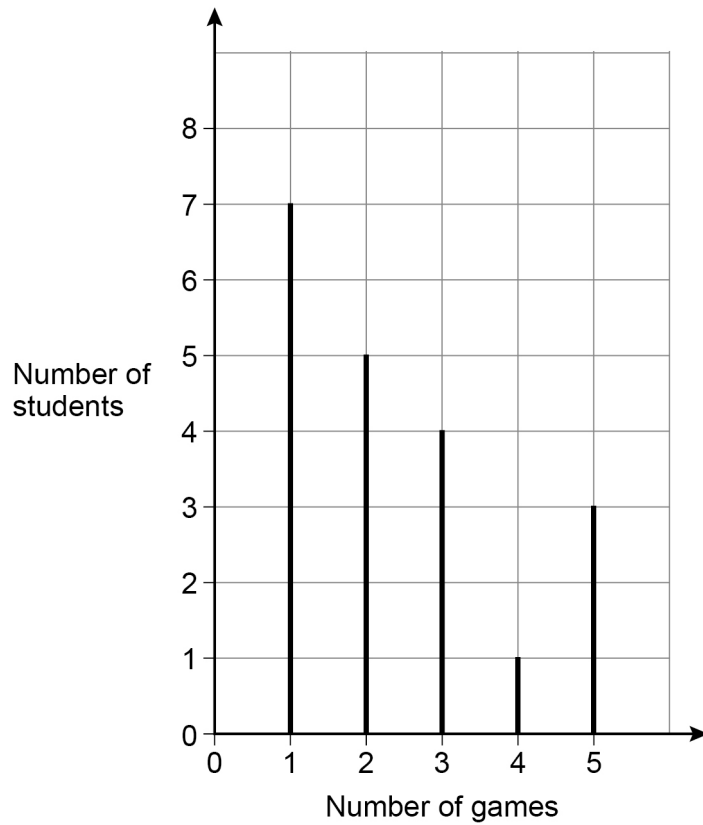
	True	False	Cannot tell
There are more green discs than blue discs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In total there are 31 discs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Turn over for the next question

Turn over ►



- 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]

Answer \_\_\_\_\_



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

**[3 marks]**

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Answer \_\_\_\_\_

**Turn over for the next question**

**Turn over ►**



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

**[2 marks]**

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Answer \_\_\_\_\_

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

**[2 marks]**

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Answer \_\_\_\_\_



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]**

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Turn over for the next question

6
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**Turn over ►**

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

[1 mark]

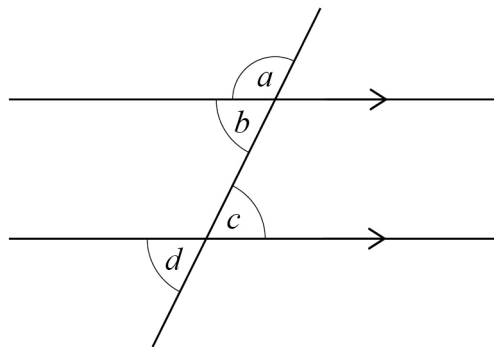
Answer \_\_\_\_\_

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

[1 mark]

Answer \_\_\_\_\_

18



Circle the pair of alternate angles.

[1 mark]

*a* and *b*

*b* and *c*

*c* and *d*

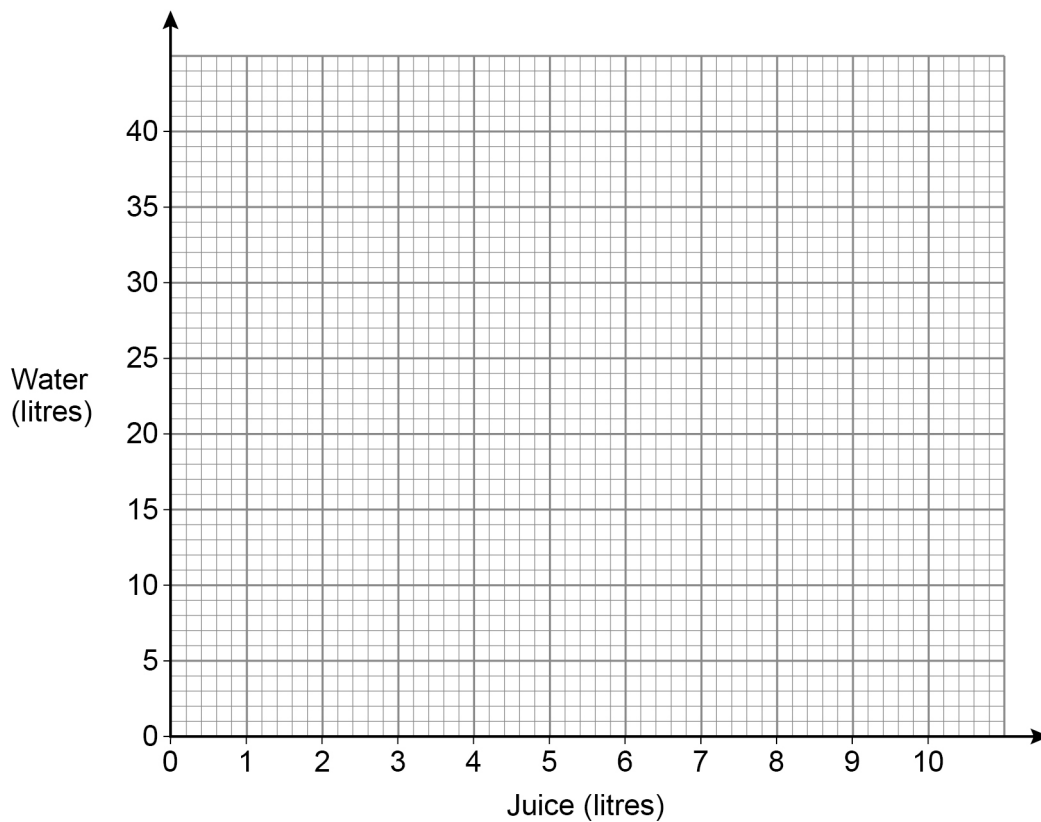
*a* and *d*



**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]**



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

**[1 mark]**

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



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]

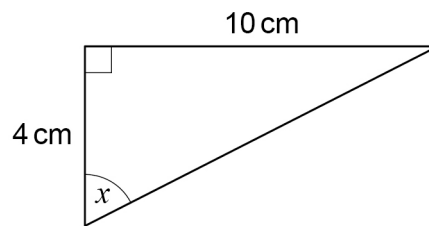
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21

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

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]**

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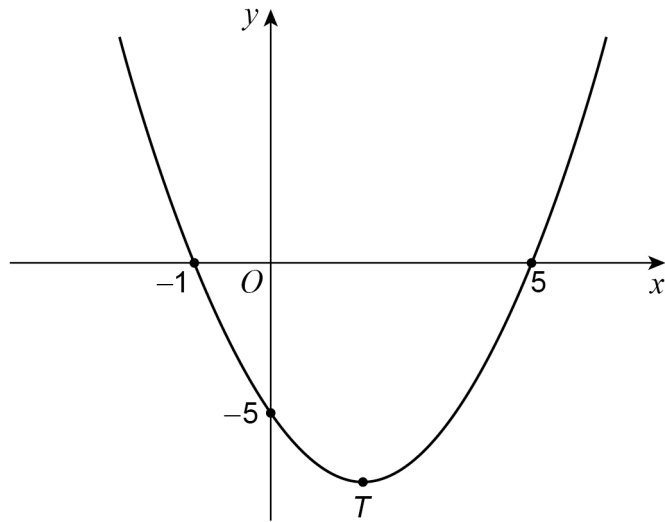
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Answer \_\_\_\_\_ %



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 \_\_\_\_\_ 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.

13                  16                  19                  22

G is a **geometric** progression.

Here are the first four terms.

2                  4                  8                  16

$$n\text{th term of A} = 8\text{th term of G}$$

Work out the value of  $n$ .**[4 marks]**

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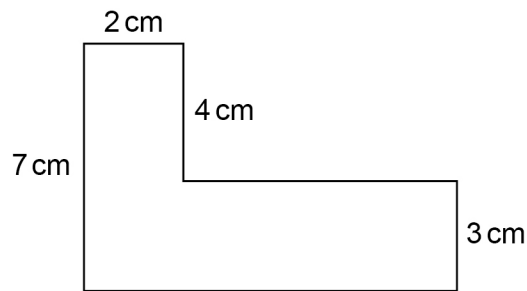
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$$n = \underline{\hspace{10em}}$$



25

The L-shape is made from rectangles.

Not drawn  
accuratelyThe area is  $44 \text{ cm}^2$ 

Work out the perimeter.

**[3 marks]**


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

26

Work out  $3\begin{pmatrix} 1 \\ 6 \end{pmatrix} + \begin{pmatrix} 2 \\ 5 \end{pmatrix}$ **[1 mark]**


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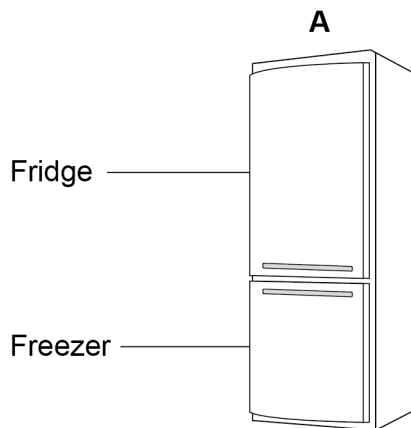
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Answer

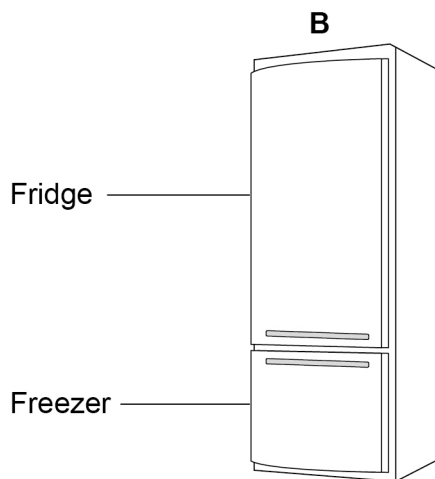
$$\left( \quad \right)$$


27

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

**Total** capacity is 330 litres

fridge capacity : freezer capacity = 3 : 2

**Fridge** capacity is 294 litres

fridge capacity : freezer capacity = 7 : 3





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]

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Answer \_\_\_\_\_



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]

$$3.5 \leq \text{mass} \leq 3.6$$

$$3.55 \leq \text{mass} \leq 3.65$$

$$3.5 \leq \text{mass} < 3.6$$

$$3.55 \leq \text{mass} < 3.65$$

END OF QUESTIONS

