

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

I declare this is my own work.

GCSE MATHEMATICS

Example-Problem Past Paper

Foundation Tier Paper 1 Non-Calculator

F

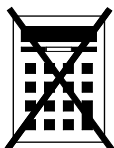
June 2023

Materials

For this paper you must have:

- mathematical instruments.

You must **not** use a calculator.



Instructions

- Engage with the fully-worked solutions in full before attempting the shadow questions.
- Explain the fully-worked solutions to yourself, anticipating the next steps in the worked solutions, making links between the problems and the mathematics used to solve them.
- Apply the methods learnt from the fully-worked solutions to the shadow questions, writing down all the workings in the spaces provided. Your thought process is important.
- 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.
- You may ask for more answer paper, graph paper and tracing paper.
- You should ask your teacher for help on a question if you do not fully understand a part of the fully-worked solution. Remember to be specific, understanding why the step was completed, rather than simply getting the correct answer.

Advice

In all calculations, show clearly how you work out your answer.

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

1 Here is a list of numbers.

14 9 20 29 3 45 33

1 (a) Which number in the list is a multiple of 4 ?

[1 mark]

Answer 20

$$4 \times 1 = 4 \quad 4 \times 2 = 8 \quad 4 \times 3 = 12 \quad 4 \times 4 = 16 \quad 4 \times 5 = 20$$

$$4, 8, 12, 16, 20, 24, 28, \dots$$

1 (b) Which number in the list is a square number?

[1 mark]

Answer 9

$$1 \times 1 = 1 \quad 2 \times 2 = 4 \quad 3 \times 3 = 9 \quad 4 \times 4 = 16 \quad 5 \times 5 = 25$$

$$1, 4, 9, 16, 25, 36, 49, 64, \dots$$

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

Do not write
outside the
box

1 Here is a list of numbers.

12 20 42 27 18 36 6

1 (a) Which number in the list is a multiple of 5?

[1 mark]

Answer _____

1 (b) Which number in the list is a square number?

[1 mark]

Answer _____

Turn over ►

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

1 Here is a list of numbers.

14 9 20 29 3 45 33

1 (c) Which **two** numbers in the list have a total of 43 ?

$$\begin{array}{r} 29 \\ + 14 \\ \hline 43 \end{array}$$

[1 mark]

Answer 29 and 14

1 (d) Work out
largest number in the list \div smallest number in the list

$$45 \div 3 = 15$$

[1 mark]

Answer 15

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

Do not write
outside the
box

1 Here is a list of numbers.

12 20 42 27 18 36 6

1 (c) Which **two** numbers in the list have a total of 45 ?

[1 mark]

Answer _____ and _____

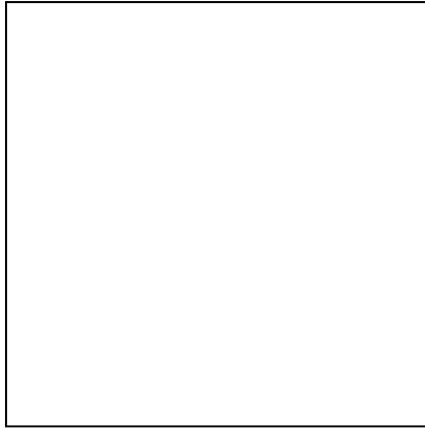
1 (d) Work out
largest number in the list \div smallest number in the list

[1 mark]

Answer _____

Turn over ►

- 2 (a) Here is a square.



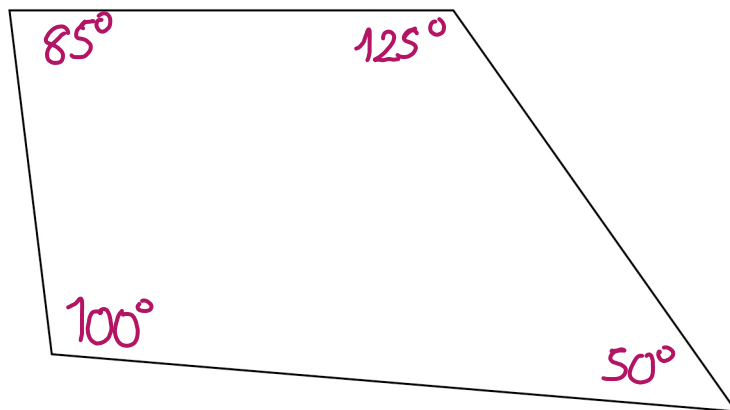
Use a ruler to measure a side length of the square.

Give your answer in **millimetres**.

[1 mark]

Answer _____ mm

- 2 (b) Here is a quadrilateral.

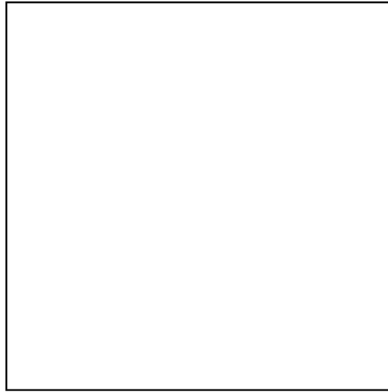


Use a protractor to measure the size of the **smallest** angle.

[1 mark]

Answer 50°

2 (a) Here is a square.

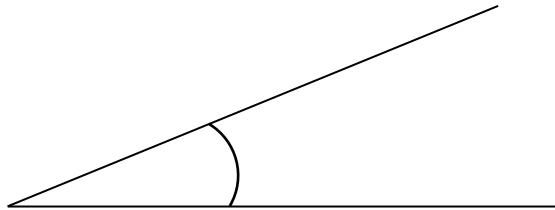


Use a ruler to measure a side length of the square.
Give your answer in **millimetres**.

[1 mark]

Answer _____ mm

2 (b) Here is an angle.

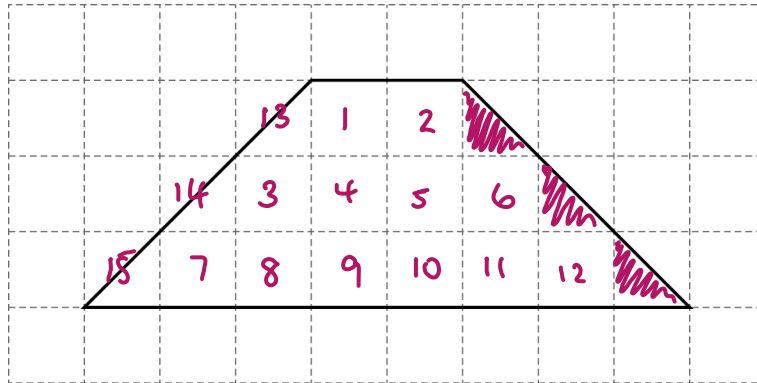


Use a protractor to measure the size of the angle.

[1 mark]

Answer _____ °

- 2 (c) A different quadrilateral is drawn on a centimetre grid.

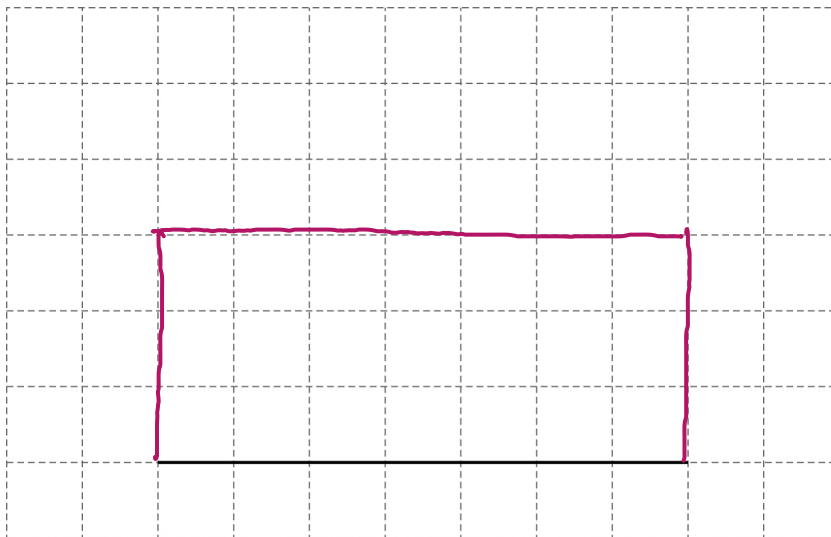


By counting squares, work out the **area** of the quadrilateral.

[1 mark]

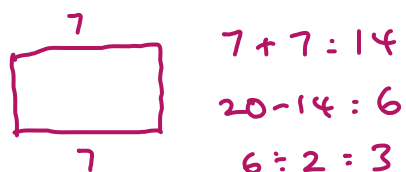
Answer 15 cm²

- 2 (d) One side of a rectangle is drawn on this centimetre grid.

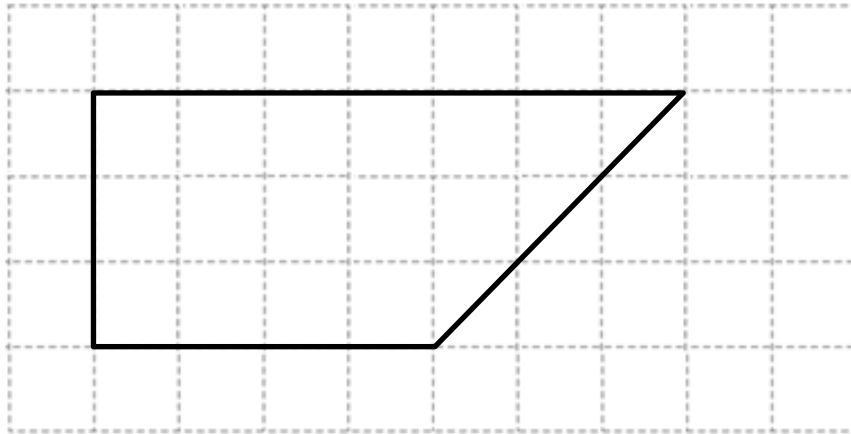


Complete the rectangle so that it has a **perimeter** of 20 cm

[1 mark]



- 2 (c) A quadrilateral is drawn on a centimetre grid.



By counting squares, work out the **area** of the quadrilateral.

[1 mark]

Answer _____ cm^2

- 2 (d) One side of a rectangle is drawn on this centimetre grid.



Complete the rectangle so that it has an **area** of 28 square centimetres.

[1 mark]

3 (a) Work out $(-4) \times (-3)$ [1 mark]

$4 \times 3 = 12$
 $(-4) \times 3 = -12$
 $(-4) \times (-3) = 12$

Answer 12

3 (b) Work out $6 \times (-5)$ [1 mark]

$6 \times 5 = 30$
 $6 \times (-5) = -30$

Answer -30

3 (c) Work out $(-8)^2$ [1 mark]

$8 \times 8 = 64$
 $(-8) \times 8 = -64$
 $(-8) \times (-8) = 64$

Answer 64

3 (d) Work out 10^3 [1 mark]

$10 \times 10 \times 10$ $10 \times 10 = 100$ $100 \times 10 = 1000$

Answer 1000

3 (a) Work out $(-2) \times (-5)$

[1 mark]

Answer _____

3 (b) Work out $3 \times (-8)$

[1 mark]

Answer _____

3 (c) Work out $(-4)^2$

[1 mark]

Answer _____

3 (d) Work out 2^3

[1 mark]

Answer _____

- 4 Write 18 out of 30 as a fraction in its simplest form.

[2 marks]

$$\frac{18}{30} \div 6 = \frac{3}{5}$$

Answer $\frac{3}{5}$

- 5 At a shop

the normal price of one pen is 24p

the normal price of one calculator is £7

The shop has these special offers.

Pens

Half the normal price

Calculators

£1.50 less than the normal price

Work out the **total** price of 5 pens and 1 calculator using the special offers.

[4 marks]

$$\text{Pens cost } \frac{1}{2} \text{ of } 24\text{p} = 12\text{p} \quad 5 \times 12\text{p} = 60\text{p}$$

$$\text{Calc. costs } £7 - £1.50 = £5.50$$

$$\begin{array}{r} £5.50 \\ + \quad 60\text{p} \\ \hline £6.10 \end{array}$$

Answer £ 6.10

- 4 Write 12 out of 40 as a fraction in its simplest form.

[2 marks]

Answer _____

- 5 At a cinema

the normal price of a ticket is £12

the normal price of a regular popcorn tub is £4.90

The cinema has these special offers.

Cinema Ticket

Half the normal price

Regular popcorn tub

£1.40 less than the normal price

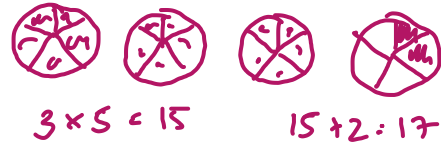
Work out the **total** price of 3 cinema tickets and 1 regular popcorn tub using the special offers.

[4 marks]

Answer £ _____

Turn over ►

- 6 (a) Write $3\frac{2}{5}$ as an improper fraction.



[1 mark]

Answer $\frac{17}{5}$

- 6 (b) Write 0.19 as a fraction.

U. $\frac{1}{10}$ $\frac{1}{100}$ $\frac{1}{1000}$
 O. 1 9

[1 mark]

Answer $\frac{19}{100}$

6 (a) Write $2\frac{3}{7}$ as an improper fraction.

[1 mark]

Answer _____

6 (b) Write 0.23 as a fraction.


[1 mark]

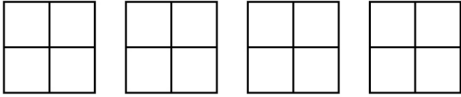
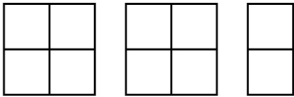
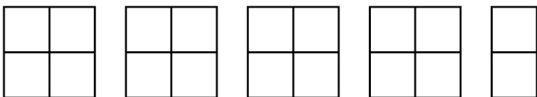


Answer _____

7

Misha recorded the main type of weather each day for **55 days**.

The pictogram shows the results for rain, snow and cloud.

Key:  = 4 days

Rain		16
Snow		10
Cloud		18
Sun		
Fog		

Sun was recorded on 1 **more** day than fog.

Complete the pictogram for the 55 days.

[4 marks]

$$16 + 10 + 18 = 44 \quad 55 - 44 = 11$$


$$11 - 1 = 10 \quad 10 \div 2 = 5 \quad \text{Sun} = 5 + 1$$












$$\text{Fog} = 5$$

7

Talal recorded the colour of 100 cars.

The pictogram shows the results.

Key:  = 8 cars

White	   
Black	  
Blue	 
Red	
Silver	
Other	 

There were 4 **more** red cars than silver cars.

Complete the pictogram for the 100 cars.

[4 marks]

8

$$T = 5P - W$$

8 (a) Work out the value of T when $P = 4$ and $W = 2$

[2 marks]

$$\begin{aligned} T &= 5(4) - (2) \\ &= 20 - 2 = 18 \end{aligned}$$

$$T = 18$$

8 (b) Work out the value of P when $T = -40$ and $W = 10$

[3 marks]

$$(-40) = 5P - (10)$$

$$+10 \quad +10$$

$$-30 = 5P$$

$$\div 5 \quad \div 5$$

$$-6 = P$$

$$P = -6$$

8

$$T = 2A - B$$

8 (a) Work out the value of T when $A = 10$ and $B = 8$

[2 marks]

$$T = \underline{\hspace{2cm}}$$

8 (b) Work out the value of A when $T = -22$ and $B = 16$

[3 marks]

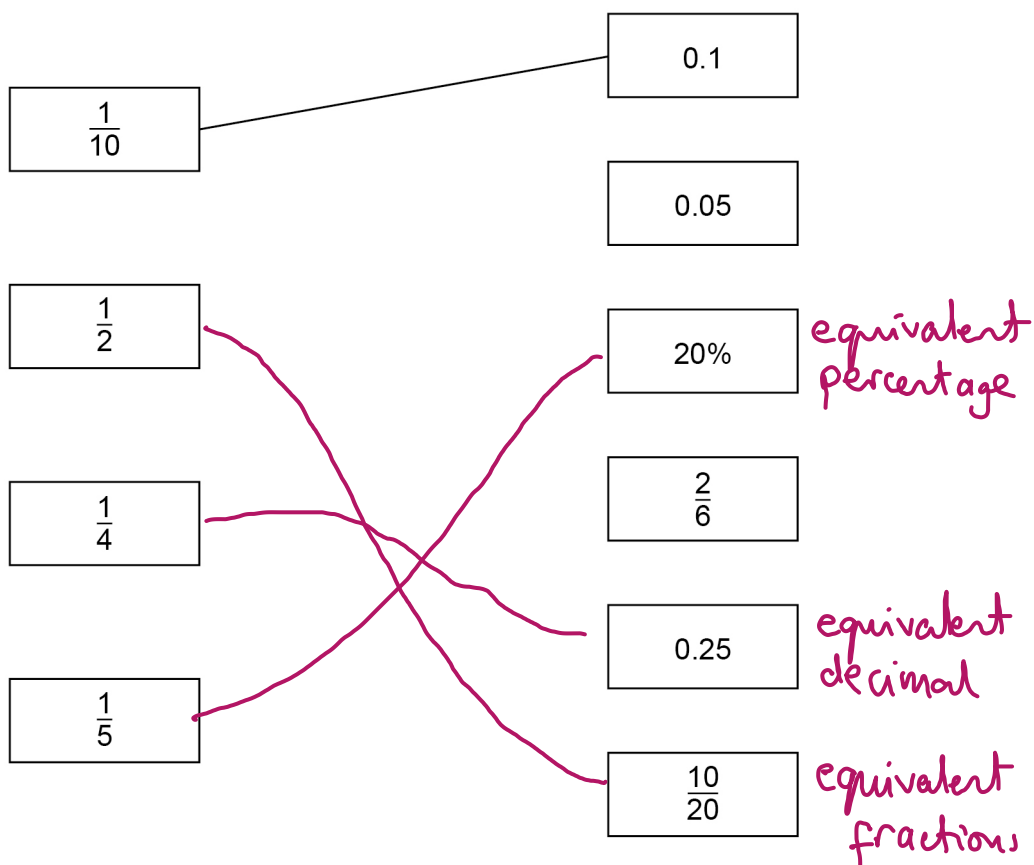
$$A = \underline{\hspace{2cm}}$$

9

Match each box on the left to the box on the right with the same value.

One has been done for you.

[3 marks]



9

Match each box on the left to the box on the right with the same value.

One has been done for you.

[3 marks]

$\frac{1}{25}$	0.04
$\frac{1}{2}$	$\frac{2}{100}$
$\frac{1}{50}$	20%
$\frac{1}{4}$	$\frac{2}{6}$
	25%
	0.5

3

Turn over ►

10

Here are two calculations, A and B.

A	$8 \times 3 + 2$
B	$21 - (15 - 4)$

$$= (24) + 2 = 26$$

$$= 21 - (11) = 10$$

Work out answer to A \times answer to B**[3 marks]**

$$26 \times 10 = 260$$

Answer 260

11

Convert 7 gallons to litres.

Use 1 gallon = 4.5 litres

[2 marks]

$$\begin{array}{r|l} 1 \text{ gal} & 4.5 \text{ l} \\ \hline \times 7 \downarrow & \downarrow \times 7 \\ 7 \text{ gal} & \end{array}$$

$$\begin{aligned} & 4.5 \times 7 \\ & = 4 \times 7 + 0.5 \times 7 \\ & = 28 + 3.5 \\ & = 31.5 \end{aligned}$$

Answer 31.5 litres

10 Here are two calculations, **A** and **B**.

A	$12 \times 2 + 6$
B	$11 - (10 - 7)$

Work out answer to **A** \times answer to **B**

[3 marks]

Answer _____

11 Convert 18 litres to gallons.

Use 1 gallon = 4.5 litres

[2 marks]

Answer _____ gallons

- 12 The table shows monthly payments for electricity.

October	November
£120	£240

Write down the percentage increase from October to November.

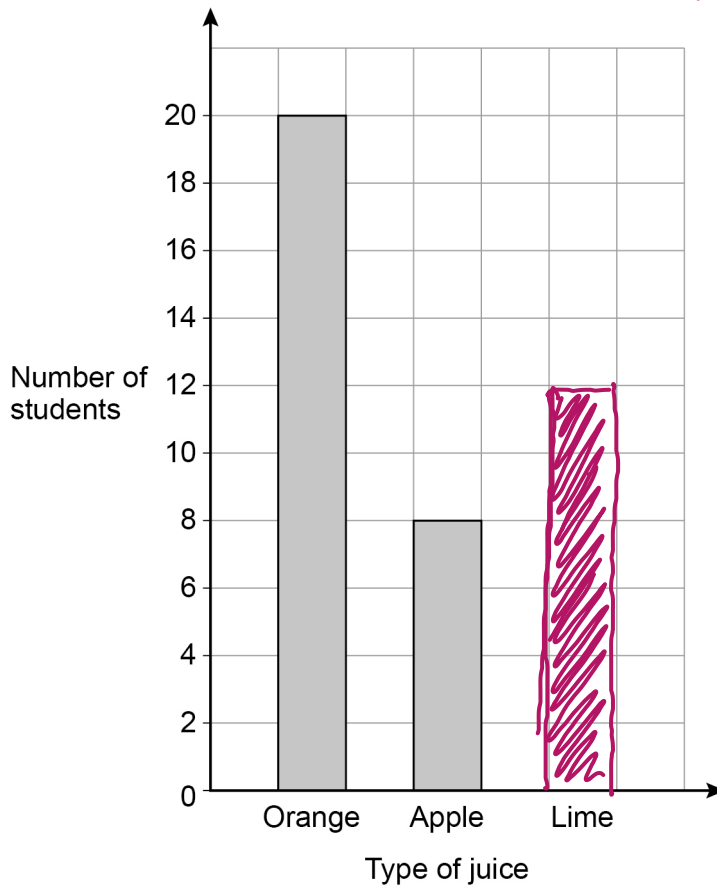
[1 mark]

$$\text{increase} = 120 \quad \frac{120}{120} \times 100 = 100$$

Answer 100 %

- 13 Students choose juice with their school meal in the ratio
orange : apple : lime = 5 : 2 : 3

$$\begin{array}{c|c|c} O & A & L \\ \hline 5 & 2 & 3 \\ \hline \times 4 \swarrow & & \searrow \times 4 \\ 20 & 8 & 12 \end{array}$$



Complete the bar chart.

[3 marks]

- 12** The table shows the number of visitors to a museum.

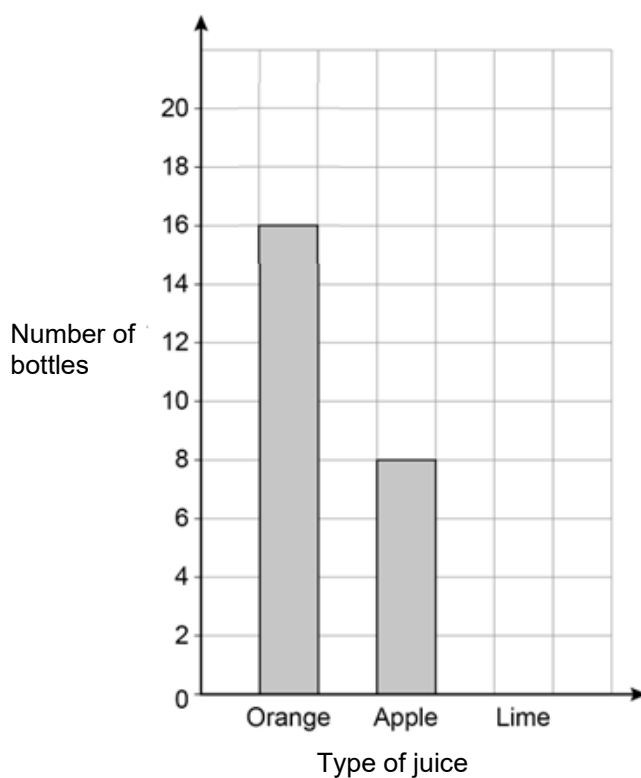
October	November
200	400

Write down the percentage increase from October to November.

[1 mark]

Answer _____ %

- 13** A shop stocks juice in the ratio
orange : apple : lime = 4 : 2 : 3



Complete the bar chart.

[3 marks]

14

Here is some data about people visiting a gym one week.

	Percentage of all visitors	Mean number of hours visiting	Range of number of hours visiting
Members	64	4	6
Guests	36	$2\frac{1}{2}$	8

Compare the data for the members with the data for the guests.

Make **three** comparisons.**[3 marks]**Comparison 1 Most of the visitors were membersComparison 2 On average, members spent more time visiting the gym.Comparison 3 The visiting time of guests was morevaried than that of members.

14

Here is some data about people visiting a ski centre one week.

	Percentage of all visitors	Mean number of hours visiting	Range of number of hours visiting
Members	32	3.5	3
Guests	68	2	4

Compare the data for the members with the data for the guests.

Make **three** comparisons.**[3 marks]**

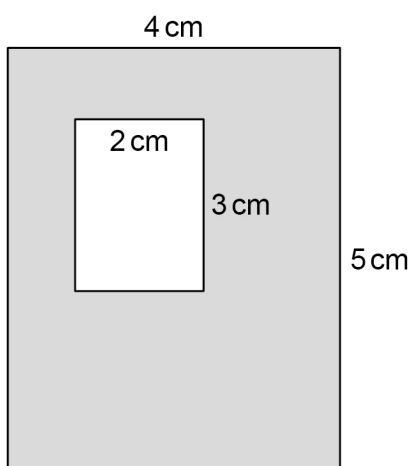
Comparison 1 _____

Comparison 2 _____

Comparison 3 _____

15

A large rectangle has a rectangular hole cut out.

Not drawn
accurately

Work out the percentage of the large rectangle that is shaded.

[3 marks]

$$\text{Area } \square = 2\text{ cm} \times 3\text{ cm} = 6\text{ cm}^2$$

$$\text{Area } \text{shaded} = 4\text{ cm} \times 5\text{ cm} = 20\text{ cm}^2$$

$$\frac{6}{20} = \frac{30}{100} = 30\%$$

Answer 30 %

16

Liz travels 18 miles in 20 minutes.

Work out her average speed in miles per hour.

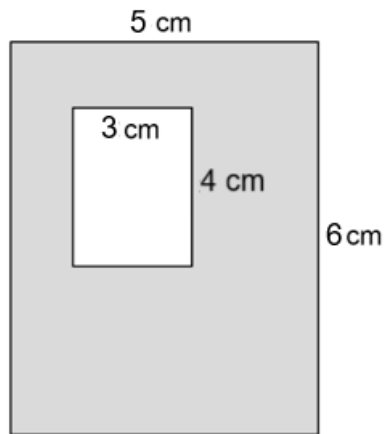
[3 marks]

$$\begin{array}{l|l} 18 \text{ miles} & 20 \text{ min} \\ \hline 54 \text{ miles} & 60 \text{ min} \end{array}$$

Answer 54 mph

- 15** A large rectangle has a rectangular hole cut out.

Not drawn
accurately



Work out the percentage of the large rectangle that is shaded.

[3 marks]

Answer _____ %

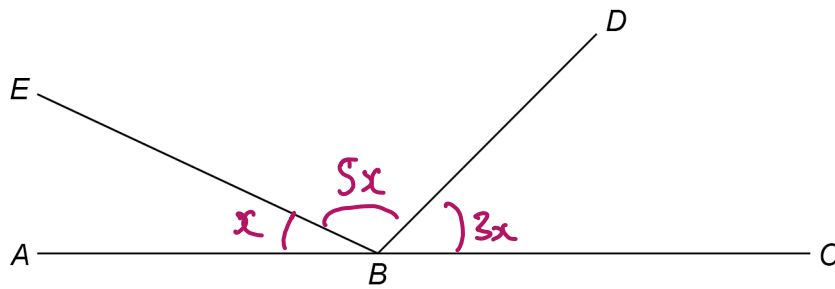
- 16** Sabina travels 12 miles in 15 minutes.

Work out her average speed in miles per hour.

[3 marks]

Answer _____ mph

17

 ABC , BD and BE are straight lines.Not drawn
accuratelyangle $EBD = 5 \times$ angle ABE (x)angle $DBC = 3 \times$ angle ABE (x)Work out the size of angle EBD .**[3 marks]**

$$x + 5x + 3x = 9x$$

$$9x = 180^\circ$$

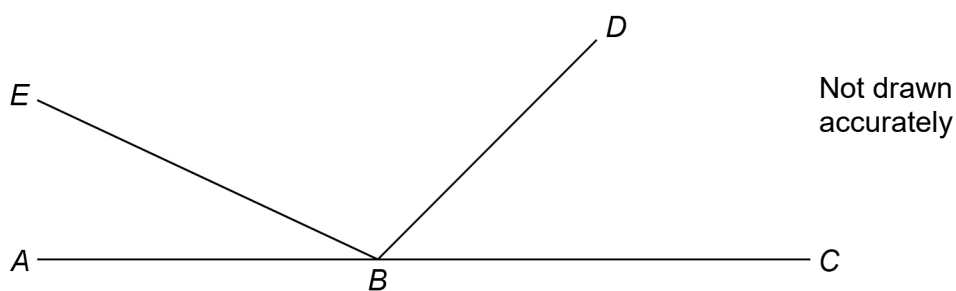
$$\div 9 \quad \div 9$$

$$x = 20^\circ$$

$$EBD = 5x = 5(20) = 100^\circ$$

Answer 100 °

17

 ABC , BD and BE are straight lines.

$$\text{angle } EBD = 6 \times \text{angle } ABE$$

$$\text{angle } DBC = 3 \times \text{angle } ABE$$

Work out the size of angle DBC .

[3 marks]

Answer _____ °

18

Two prime numbers are multiplied together.

The answer is an **even** number between 50 and 60

Complete the calculation.

[3 marks]

$$\boxed{2} \times \boxed{29} = \boxed{58}$$

2, 3, 5, 7, 11, 13, 17, 19, 23, 29.

even \times even = even $2 \times 29 = 58$

even \times odd = even

19

Andrew and Bruce share some money in the ratio 5 : 6

Bruce gets £96

Andrew gives $\frac{1}{4}$ of his share to Carl.Bruce gives $\frac{2}{3}$ of his share to Carl.

How much money does Carl receive?

[4 marks]

A ○ ○ ○ ○ ○

A: £80

$\frac{1}{4}$ of 80 = 20

B ○ ○ ○ ○ ○ ○
£96

B: £96

$\frac{2}{3}$ of 96 = 64

$96 \div 6 = 16$

$16 \times 5 = 80$

C = 20 + 64
= 84

Answer £ 84

18

Two prime numbers are multiplied together.

The answer is an **even** number between 40 and 50

Complete the calculation.

[3 marks]

$$\square \times \square = \square$$

19

Chloe and Mikey share some money in the ratio 3 : 4

Mikey gets £72

Chloe gives $\frac{1}{6}$ of her share to Pippa.Mikey gives $\frac{4}{9}$ of his share to Pippa.

How much money does Pippa receive?

[4 marks]

Answer £ _____

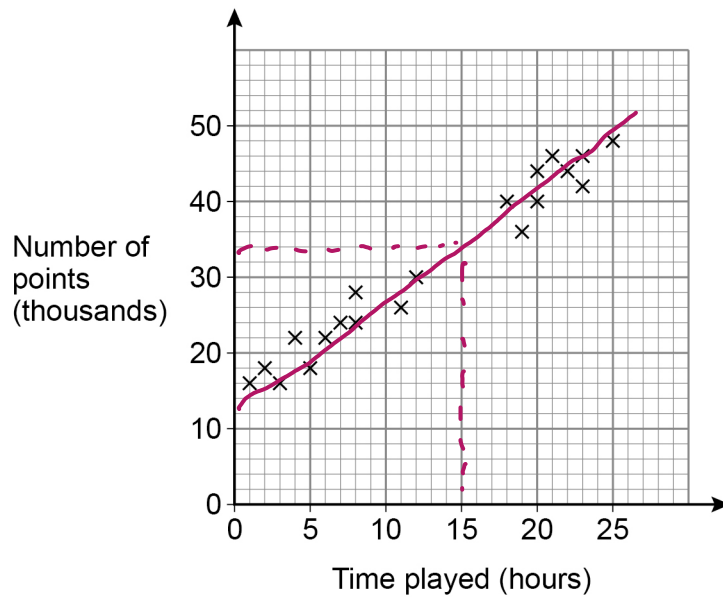
7

Turn over ►

20

Players score points in a game.

The scatter graph shows the time played and the points scored by some players.



20 (a) Circle the strength and type of correlation shown.

[1 mark]

weak positive

strong positive

weak negative

strong negative

20 (b) Players get one extra life for every 2000 points they score.

Jonah plays the game for 15 hours.

Use a line of best fit to estimate the number of extra lives he gets.

[3 marks]

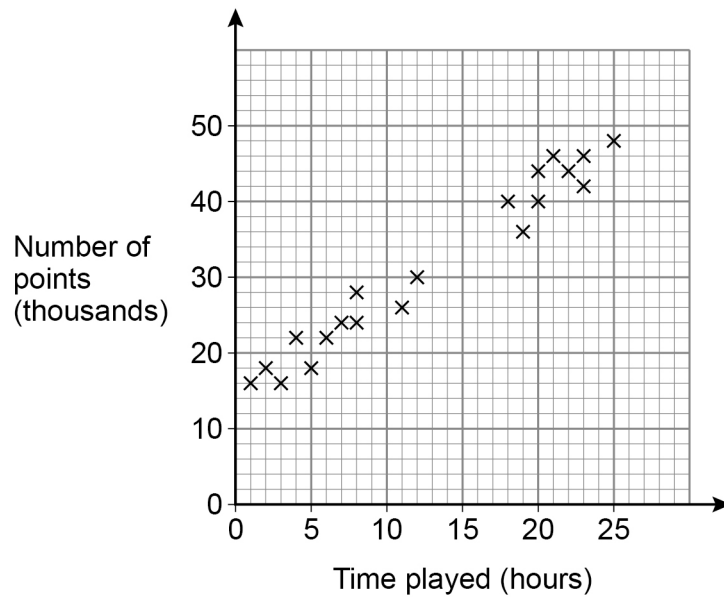
$$177 \left(\frac{1 \text{ life}}{2000 \text{ pts}} \right) \times 34000 \text{ pts} = 17$$

Answer 17

20

Players score points in a game.

The scatter graph shows the time played and the points scored by some players.

**20 (a)** Circle the type of correlation shown.**[1 mark]**

none

weak

negative

positive

20 (b) Players get one extra life for every 500 points they score.

Amy plays the game for 10 hours.

Use a line of best fit to estimate the number of extra lives she gets.

[3 marks]

Answer _____

21

$$2^a \times 3 \times 5^2 = 600$$

Work out the value of a .

You **must** show your working.

[3 marks]

$$600 : 60 \times 10$$

$$= 6 \times 10 \times 10$$

$$= 2 \times 3 \times 2 \times 5 \times 2 \times 5$$

$$= 2^3 \times 3 \times 5^2$$

$$a = 3$$

$$a = 3$$

22

Expand and simplify fully $5(3x + 4) - 2(x - 1)$

[2 marks]

$$\begin{array}{r|l} & 3x + 4 \\ 5 & 15x + 20 \end{array}$$

$$\begin{array}{r|l} & x - 1 \\ -2 & -2x + 2 \end{array}$$

$$15x + 20 - 2x + 2$$

$$= 15x - 2x + 20 + 2$$

$$\text{Answer } 13x + 22$$

21 $2^a \times 3^2 \times 5 = 360$

Work out the value of a .

You **must** show your working.

[3 marks]

$a =$ _____

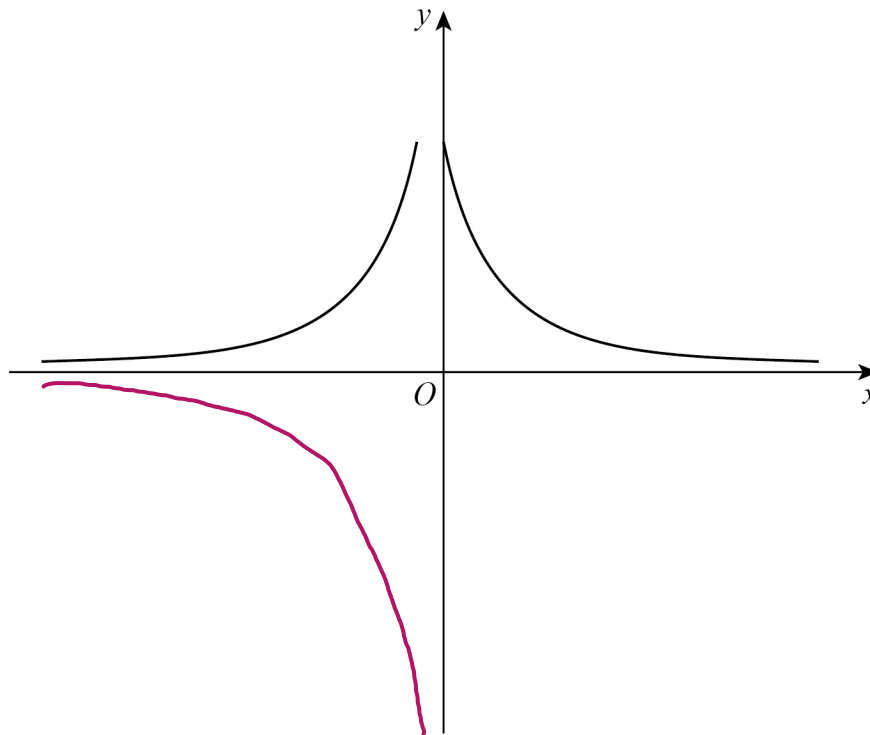
22 Expand and simplify fully $2(5x + 6) - 3(x - 2)$

[2 marks]

Answer _____

23

Erika tries to sketch the graph $y = \frac{1}{x}$ with $x \neq 0$



Make **two** different criticisms of her sketch.

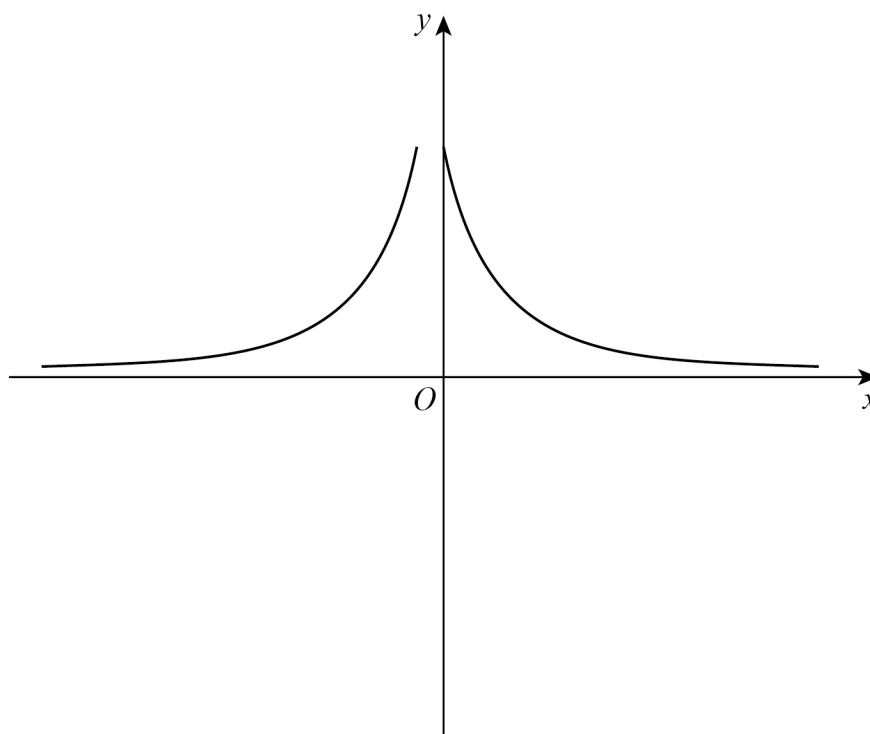
[2 marks]

Criticism 1 The decreasing part of the graph shouldn't intersect the y-axis.

Criticism 2 The part of the graph on the left of the y-axis should be reflected.

23

Erika tries to sketch the graph $y = \frac{1}{x}$ with $x \neq 0$



Make **two** different criticisms of her sketch.

[2 marks]

Criticism 1 _____

Criticism 2 _____

Turn over ►

24

Sunita is x years old.

Beth is one year younger than Sunita.

Joel is double Sunita's age.

The mean of their ages is 5

How old is **Joel**?**[5 marks]**S x B $x-1$ J $2x$

$$\frac{x + x - 1 + 2x}{3} = 5$$

$$\frac{4x - 1}{3} = 5$$

$$\times 3 \quad \times 3$$

$$4x - 1 = 15$$

$$+1 \quad +1$$

$$4x = 16$$

$$\div 4 \quad \div 4$$

$$x = 4$$

$$2x = 2(4) = 8$$

Answer

8

[5 marks]

Answer

E

Turn over ►

25

Work out $2\frac{1}{3} \div \frac{4}{5}$

Give your answer as a mixed number.

[4 marks]

$$2\frac{1}{3} = \frac{7}{3}$$

$$\frac{7}{3} \div \frac{4}{5} = \frac{7}{3} \times \frac{5}{4} = \frac{35}{12}$$

$$\frac{35}{12} = 2\frac{11}{12}$$

Answer $2\frac{11}{12}$

25Work out $3\frac{1}{4} \div \frac{2}{5}$

Give your answer as a mixed number.

[4 marks]

Answer _____

END OF QUESTIONS