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I declare this is my own work.

GCSE MATHEMATICS

F

Foundation Tier

Paper 1 Non-Calculator

Shadow paper based on November 2022 question paper

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- mathematical instruments
- the Formulae Sheet (enclosed).



You must **not** use a calculator.

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	
TOTAL	

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

1 Circle the length of time between 3.15 pm and 4.20 pm **[1 mark]**

45 min

55 min

65 min

105 min

2 A circle has radius 10 cm
Circle the diameter. **[1 mark]**

5 cm

10 cm

20 cm

100 cm

3 Circle the percentage that is between $\frac{1}{4}$ and $\frac{1}{2}$ **[1 mark]**

20%

40%

60%

80%

4 Circle the value of $4^2 + 5^2$ [1 mark]

18

26

41

81

5 Simplify fully $7a - 4b + 3a - 2b$ [2 marks]

Answer _____

Turn over for the next question

Turn over ►

- 6** 250 teachers were each asked about the monthly cost of their season ticket for travel. Here are the results.

	Less than £50	£50 or over
School teachers	41	56
College teachers	49	104

- 6 (a)** How many **more** college teachers than school teachers were asked?

[2 marks]

Answer _____

- 6 (b)** What percentage of the 250 teachers had a monthly cost **more than £50** ?

[2 marks]

Answer _____ %

7 The only animals at a rescue centre are 40 dogs and 60 cats.

$\frac{3}{5}$ of the 40 dogs are found new homes

and

$\frac{5}{6}$ of the 60 cats are found new homes.

Work out the **total** number of animals that are found new homes.

[3 marks]

Answer _____

8 Some shoppers were asked which type of cheese they preferred.

54% said Cheddar.

22% said Red Leicester.

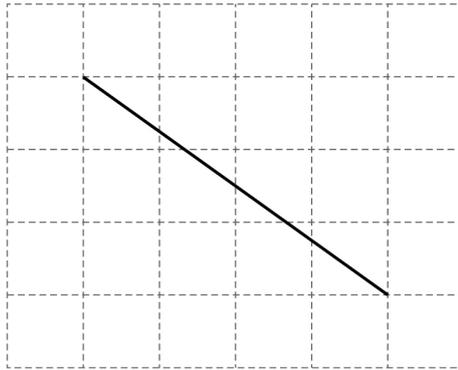
The rest said Stilton.

What percentage said Stilton?

[2 marks]

Answer _____ %

- 9 (a) A diagonal of a rectangle is drawn on a centimetre grid.
The sides of the rectangle are on the grid lines.



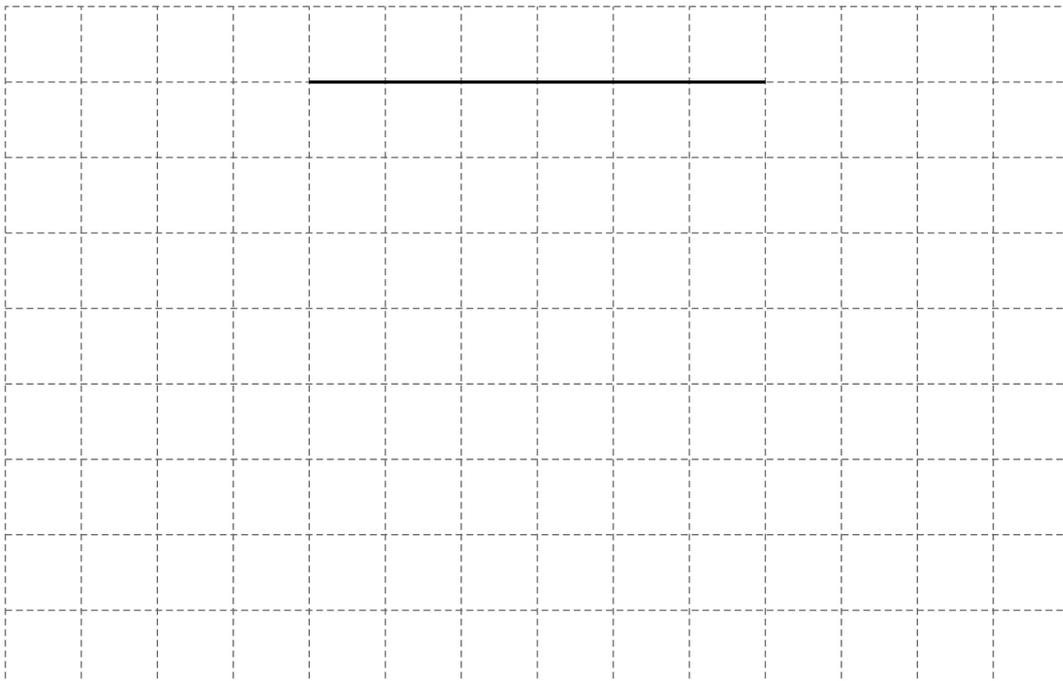
Work out the perimeter of the rectangle.

[2 marks]

Answer _____ cm

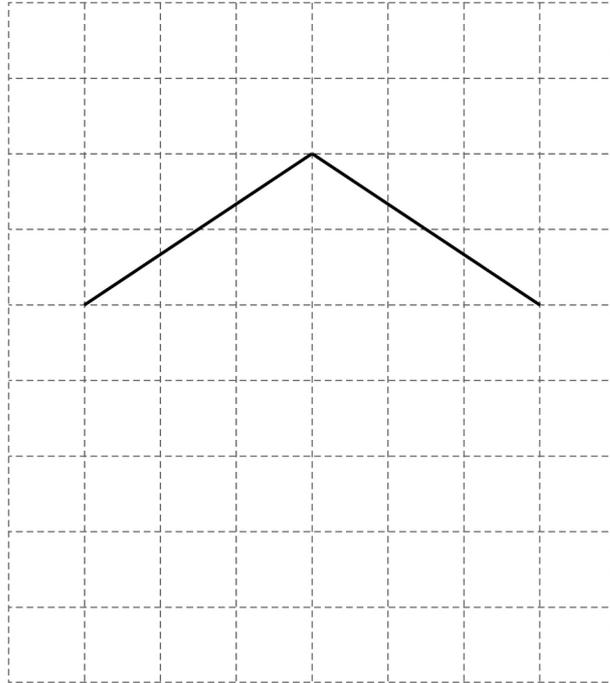
- 9 (b) One side of a trapezium is drawn on this centimetre grid.
Complete the trapezium so that it has area 42 cm^2

[2 marks]



- 9 (c)** Two sides of a rhombus are drawn on this grid.
Complete the rhombus.

[1 mark]



- 10** Here is a calculation.

$$528 \times 25 = 13\,200$$

Use the calculation to help answer the following questions.

- 10 (a)** Write down the answer to $13\,200 \div 528$

[1 mark]

Answer _____

- 10 (b)** Circle the answer to 264×25

[1 mark]

1320

3300

6600

26400

Turn over ►

11 A shop sells paintbrushes and rollers.

Paintbrushes
Pack of 6 for £15

Rollers
£6 each
or
Pack of 8 for £45

11 (a) Kevin buys some **packs** of paintbrushes.

The cost is £90

In total, how many **paintbrushes** does he buy?

[2 marks]

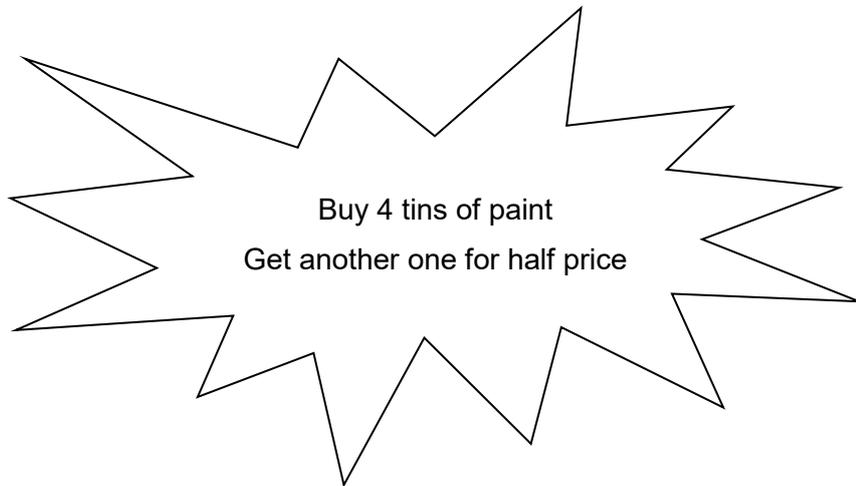
Answer _____

11 (b) Work out the cheapest cost of 12 rollers.

[3 marks]

Answer £ _____

- 11 (c) The shop also sells tins of paint for £14 each.
The shop has this offer.

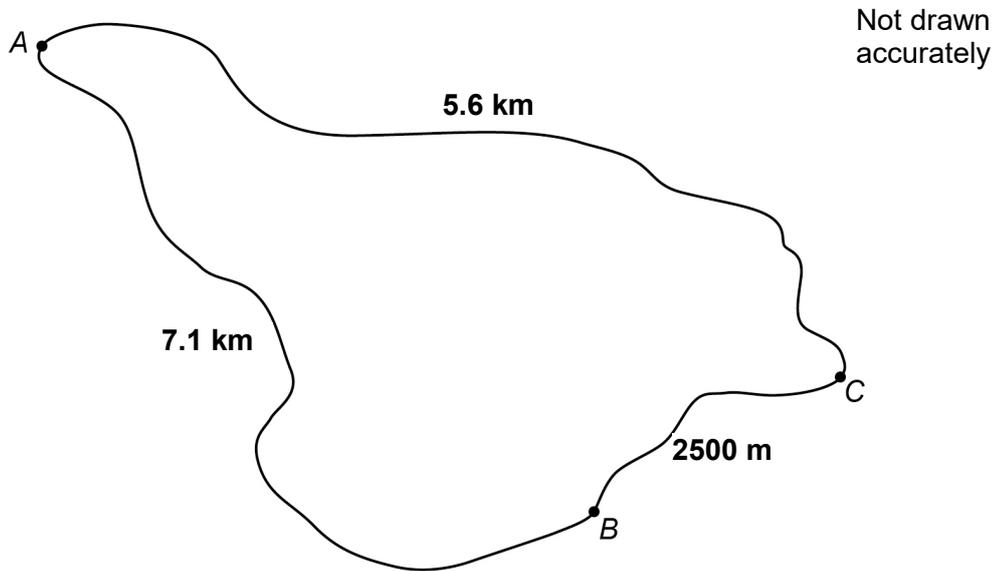


Work out the cost of 5 tins of paint using the offer.

[3 marks]

Answer £ _____

- 12 (a)** A , B and C are connected by cycle paths.
The length of each cycle path is shown.



Nelson and Shona each cycle from A to B .

Nelson cycles along the path $A \rightarrow B$

Shona cycles along the paths $A \rightarrow C \rightarrow B$

How much **further** does Shona cycle than Nelson?

Give your answer in kilometres.

[3 marks]

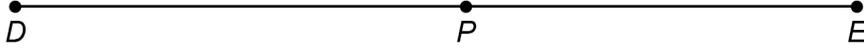
Answer _____ km

- 12 (b) A straight path between D and E passes through P .

$$DE = 300 \text{ metres}$$

P is 80 metres **closer** to E than to D .

Not drawn
accurately



Work out the ratio $DP : PE$

Give your answer in its simplest form.

[3 marks]

Answer :

- 13 Ethan tries to simplify $ab \times 3$
Here is his method.

$$a \times 3 = 3a$$

$$b \times 3 = 3b$$

$$3a \times 3b = 9ab$$

What is wrong with his method?

[1 mark]

Turn over ►

15 (a) Solve $12x - 2 = 7x + 1$

[3 marks]

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

15 (b) Solve $\frac{3x}{5} = 21$

[2 marks]

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

16 Crate A and crate B each contain only brown bottles and green bottles.

Crate A	Contains 30 brown bottles There are three times as many brown bottles as green bottles
Crate B	Contains 20 green bottles There are 4 brown bottles for every 5 green bottles

16 (a) Work out the **total** number of bottles.

[3 marks]

Answer _____

16 (b) A different crate, C, is empty.

The 30 brown bottles from A are put into C.

The 20 green bottles from B are also put into C.

One bottle is now picked at random from each crate.

Complete each statement.

[3 marks]

The probability of brown from A is _____

The probability of brown from B is _____

The probability of brown from C is _____

17 What is $\frac{1}{200}$ as a decimal?

Circle your answer.

[1 mark]

0.02

0.05

0.002

0.005

18 Divide 68 in the ratio 3 : 5

[3 marks]

Answer

and

—

19 n is an even number.

Why is $n(n + 1) + 1$ always an odd number?

[2 marks]

20

Here is some information about the time spent at work by 45 women and 45 men last week.

Time spent, t (hours)	Number of women	Number of men
$25 < t \leq 30$	13	11
$30 < t \leq 35$	12	18
$35 < t \leq 40$	15	10
$40 < t \leq 45$	3	5
$45 < t \leq 50$	2	1

Tick **one** box for each statement.

[3 marks]

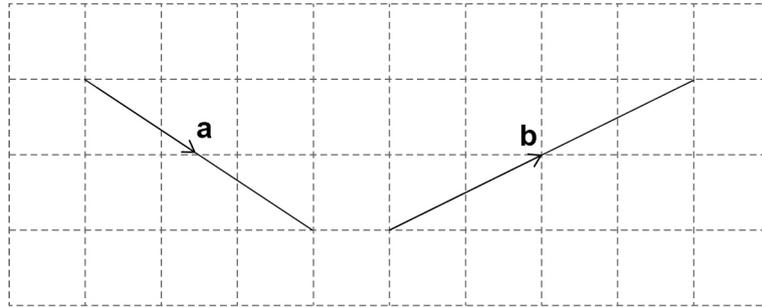
	Definitely true	Might be true	Cannot be true
Five of the women spent more than 40 hours at work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The range for the men is 25 hours.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The men have a higher median than the women.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Turn over for the next question

Turn over ►

21 The diagram shows the vectors **a** and **b**.

As a column vector $\mathbf{a} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$



21 (a) What is **b** as a column vector?

[2 marks]

Answer $\begin{pmatrix} \\ \end{pmatrix}$

21 (b) Work out $3\mathbf{a}$ as a column vector.

[1 mark]

Answer $\begin{pmatrix} \\ \end{pmatrix}$

21 (c) $\mathbf{a} + \mathbf{c} = \begin{pmatrix} 2 \\ 0 \end{pmatrix}$

Work out **c** as a column vector.

Circle your answer.

[1 mark]

$\begin{pmatrix} -2 \\ -1 \end{pmatrix}$	$\begin{pmatrix} 2 \\ -1 \end{pmatrix}$	$\begin{pmatrix} -1 \\ 2 \end{pmatrix}$	$\begin{pmatrix} 1 \\ -2 \end{pmatrix}$
--	---	---	---

24

Here is some information about 150 people who visit a museum which has a shop and a cafe.

$\frac{2}{3}$ of the people visit neither the museum shop nor the museum cafe.

24 people visit the museum shop.

29 people visit the museum cafe.

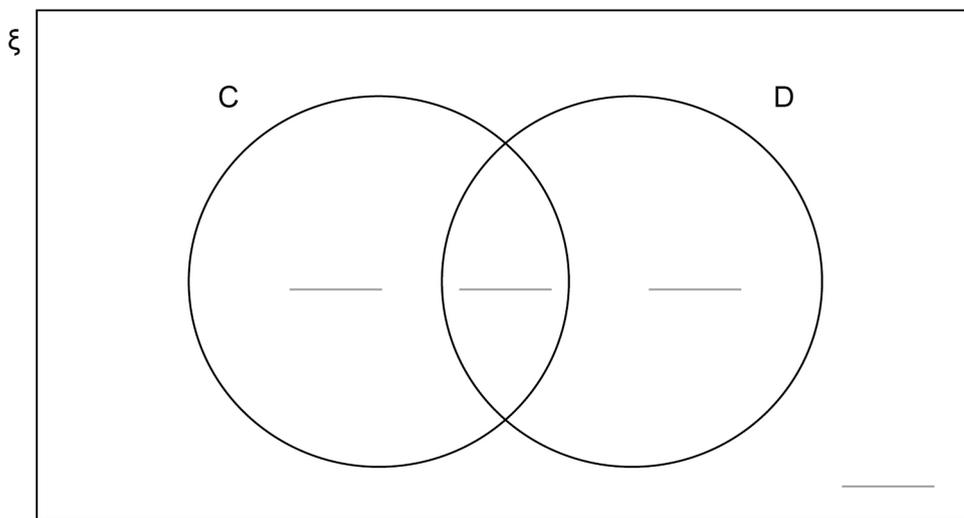
Complete this Venn diagram to represent the information.

[3 marks]

ξ = 150 people who visit the museum

C = people visit the museum shop

D = people visit the museum cafe



25 Write $(2^7 \times 2^4) : 2^5$ in the form $n : 1$ where n is an integer.

[3 marks]

Answer : 1

26 a is 20% less than b .

Circle the ratio $a : b$

[1 mark]

10 : 8

8 : 2

8 : 10

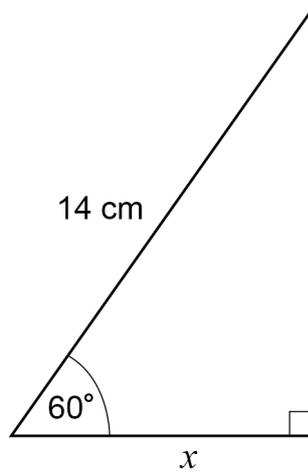
2 : 8

Turn over for the next question

7

Turn over ►

27

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

 $x =$ _____ cm**END OF QUESTIONS**

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