

Please write clearly in block capitals.

Centre number

Candidate number

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE MATHEMATICS

H

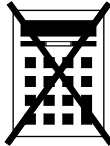
Higher Tier Paper 1 Non-Calculator

Wednesday 6 November 2024 Morning 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.

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	
TOTAL	

Advice

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



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

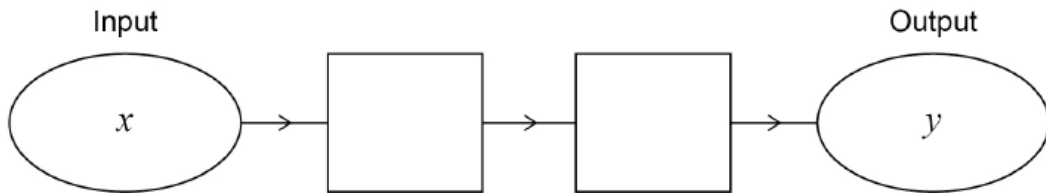
1 Work out the value of 1.5^2

[2 marks]

Answer _____

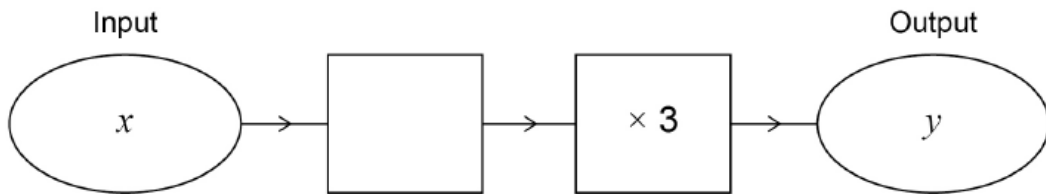
2 (a) Complete this number machine so that $y = 4x + 5$

[1 mark]



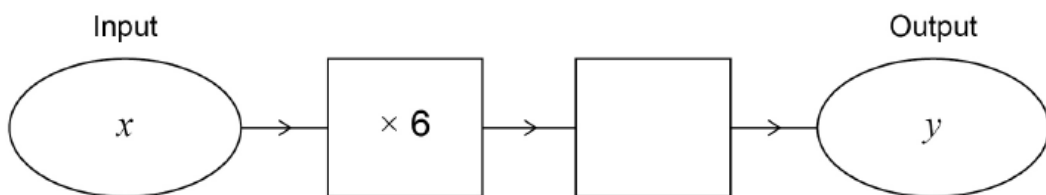
2 (b) Complete this number machine so that $y = 3x - 24$

[1 mark]



2 (c) Complete this number machine so that $y = x$

[1 mark]



3 Each number in a list is increased by 10

Tick **one** box for each statement.

[3 marks]

	True	False	Cannot tell
The mode is increased by 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The median is increased by 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The range is increased by 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4 (a) Write the missing term in the geometric progression.

[1 mark]

1 4 16 _____ 256

4 (b) A Fibonacci-type sequence begins

5 -9

The sequence is continued by adding the previous two terms.

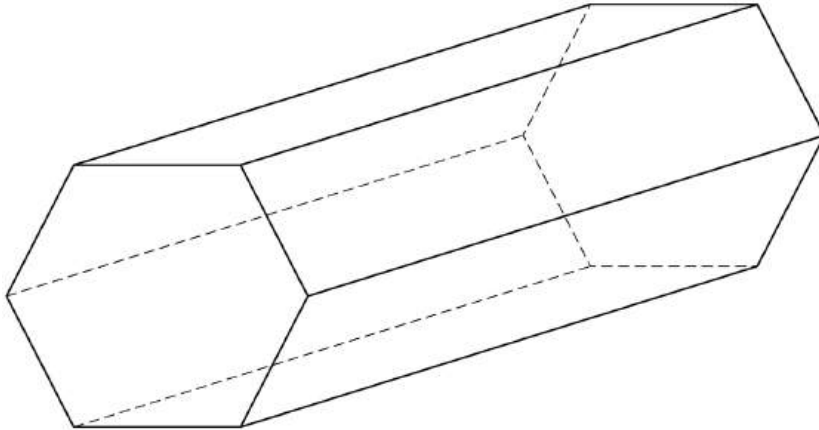
Work out the next **two** terms.

[2 marks]

Answer _____ and _____



5 Here is a solid prism.



5 (a) How many faces does the prism have?

[1 mark]

Answer _____

5 (b) The prism has

$$\text{volume} = 3500 \text{ cm}^3$$

and

$$\text{length} = 20 \text{ cm}$$

Work out the area of the cross-section of the prism.

[2 marks]

Answer _____ cm^2



6 Work out $1\frac{1}{5} - \frac{3}{10}$

Give your answer as a fraction.

[2 marks]

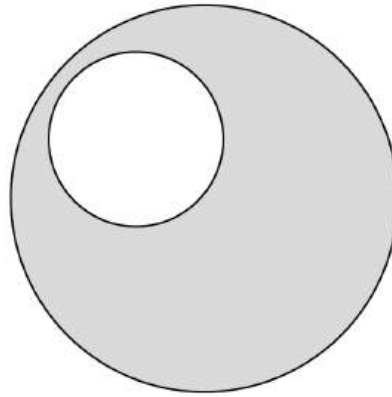
Answer _____

Turn over for the next question



- 7 A large circle and a small circle are shown.
The radius of the large circle is 12 cm

$$\text{radius of large circle} : \text{radius of small circle} = 4 : 1$$



Not drawn
accurately

Work out the shaded area.

Give your answer in terms of π

[4 marks]

Answer _____ cm^2



8 (a) In this part, assume that each person works at the same rate.

10 people can complete a job in 9 hours.

If 15 people work on the same job, how many hours will it take to complete the job?

[2 marks]

Answer _____ hours

8 (b) In fact, of the 15 people

6 work at a slower rate

9 work at a faster rate.

What does this mean about the number of hours it will take to complete the job?

Tick **one** box.

[1 mark]

It is greater than the answer to (a)

It is the same as the answer to (a)

It is less than the answer to (a)

It is not possible to say

7

Turn over ►



9

$$\begin{pmatrix} a \\ 2 \end{pmatrix} + \begin{pmatrix} 1 \\ 3b \end{pmatrix} = \begin{pmatrix} 5 \\ 20 \end{pmatrix}$$

Work out the values of a and b .

[3 marks]

$a =$ _____ $b =$ _____



10

Clive owns two coffee shops, A and B.

Out of 150 people

- 18 people use both shops
- 46% use shop A
- $\frac{2}{5}$ use shop B **only**.

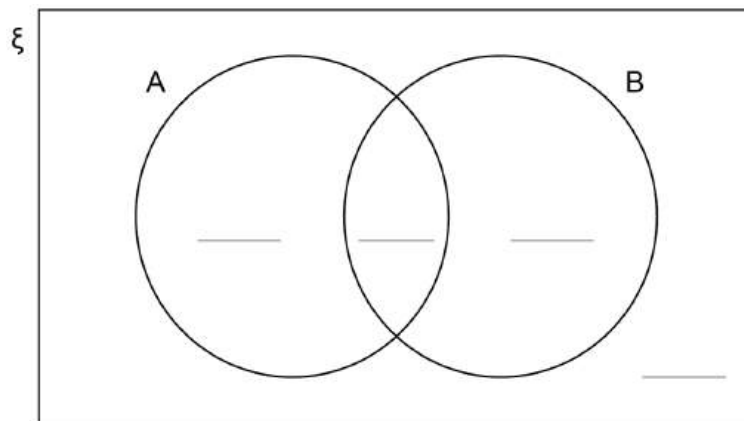
Complete the Venn diagram to represent the information.

[4 marks]

$\xi = 150$ people

A = people who use shop A

B = people who use shop B





11 Construct the region that lies within 4 cm of the line.

[3 marks]



13 (a) By rounding each number to one significant figure,

estimate the value of $\frac{\sqrt{401} + 1.9^3}{\cos 58.7^\circ}$

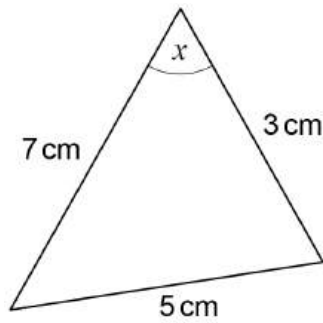
You **must** show your working.

[3 marks]

Answer _____



13 (b) Here is a triangle.



Not drawn
accurately

Sam attempts to find the value of $\cos x$ using the cosine rule.

Here is his working.

$$5^2 = 3^2 + 7^2 + 2 \times 3 \times 7 \times \cos x$$

$$5^2 = 10^2 + 42 \times \cos x$$

$$25 = 142 \cos x$$

$$\text{Therefore } \cos x = \frac{25}{142}$$

Identify **two** errors Sam has made.

[2 marks]

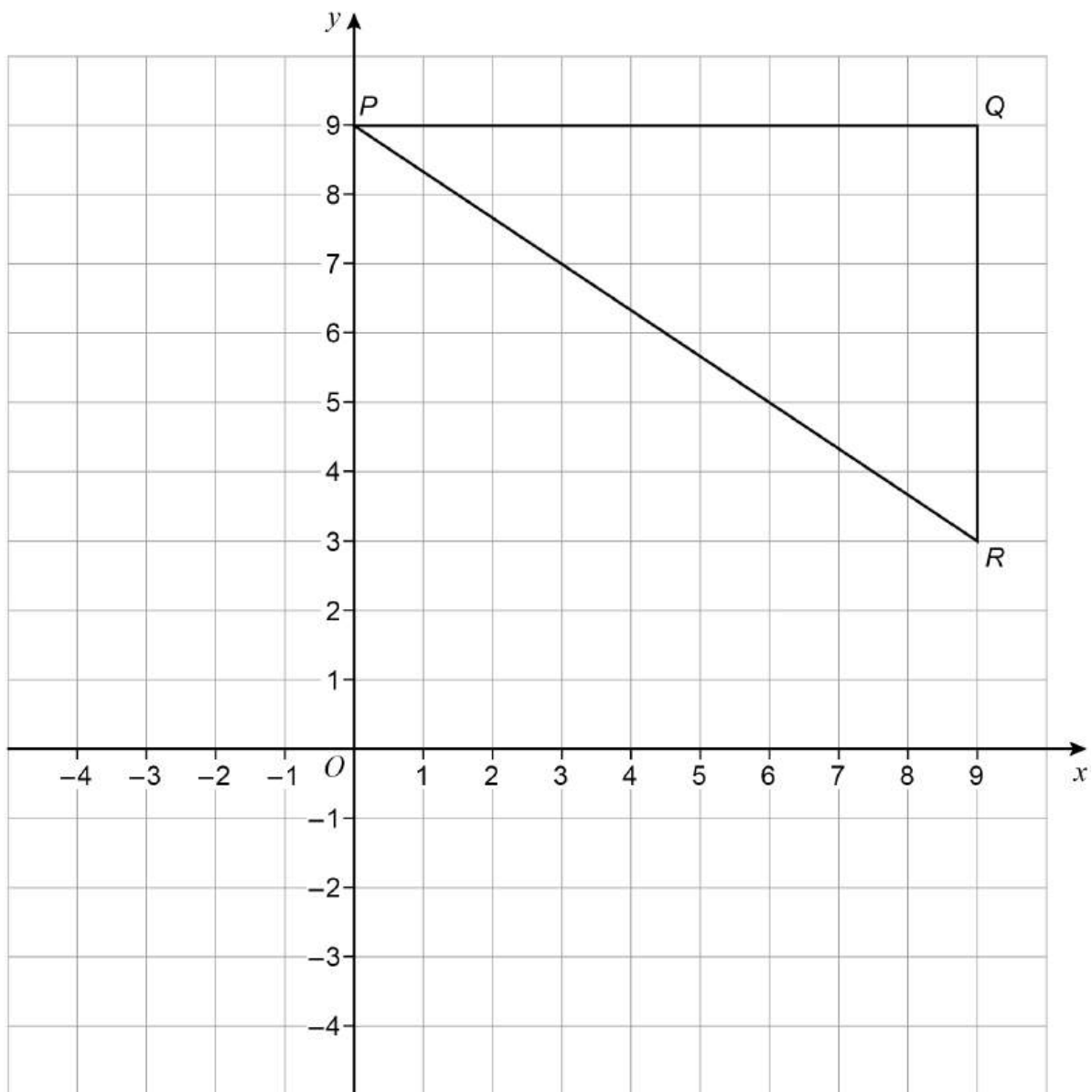
Error 1 _____

Error 2 _____



- 14 Enlarge triangle PQR by scale factor $-\frac{1}{3}$ with centre $(0, 0)$

[3 marks]



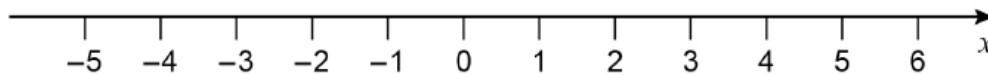
15 (a) Solve the inequality $20 - 5x \leq 30$

[3 marks]

Answer _____

15 (b) Represent $x > -1$ on the number line.

[1 mark]



16 When w is **truncated** the answer is 8

Sacha writes the error interval due to truncation as $7.5 \leq w < 8.5$

Give a reason why Sacha is wrong and state the correct error interval for w .

[2 marks]

Reason _____

Correct error interval _____ $\leq w <$ _____



17 (a) A circle has centre $(0, 0)$ and circumference 36π

Work out the equation of the circle.

[2 marks]

Answer _____

17 (b) Point J has coordinates $(15, 0)$ and point K has coordinates $(30, -5)$

Work out the equation of the straight line through J and K .

[4 marks]

Answer _____



18 (a) Express $x^2 + 8x - 5$ in the form $(x + a)^2 - b$ where a and b are integers.

[2 marks]

Answer _____

18 (b) A curve has the equation $y = (x - 7)^2 + 8$

Write down the coordinates of the turning point of the curve.

[2 marks]

Answer (_____ , _____)

Turn over for the next question



20 (a) Show that $\frac{\sqrt{363}}{\sqrt{3}}$ simplifies to an integer.

[2 marks]

20 (b) Rationalise the denominator and simplify $\frac{20}{\sqrt{5}}$

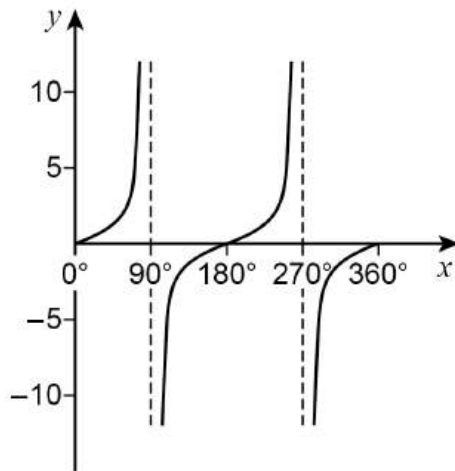
[2 marks]

Answer _____

Turn over for the next question



21 Here is a sketch of the graph of $y = \tan x$ where $0^\circ \leq x \leq 360^\circ$



You are given that $\tan 78.69^\circ = 5$

21 (a) Work out the other value of x where $\tan x = 5$ and $0^\circ \leq x \leq 360^\circ$

[1 mark]

Answer _____[°]

21 (b) Work out the **two** values of x where $\tan x = -5$ and $0^\circ \leq x \leq 360^\circ$

[2 marks]

Answer _____[°] and _____[°]



22

$$7^n = x$$

Match each expression on the left to the correct expression on the right.
One has been done for you.

[3 marks]

7^{-n}	$7x$
7^{2n}	$\frac{1}{x}$
7^{n+1}	$\frac{1}{2}x$
$7^{\frac{1}{2}n}$	\sqrt{x}
	x^2

Turn over for the next question

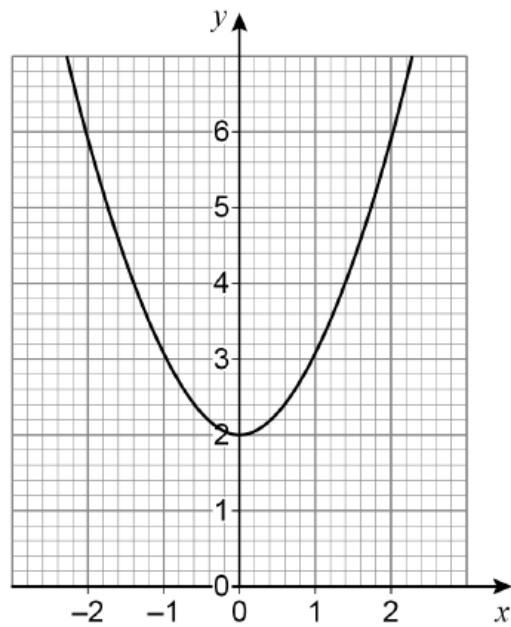
Turn over ►



23 In each part, the graph shown is a transformation of the graph $y = x^2$

23 (a) Write down the equation of the graph shown.

[1 mark]

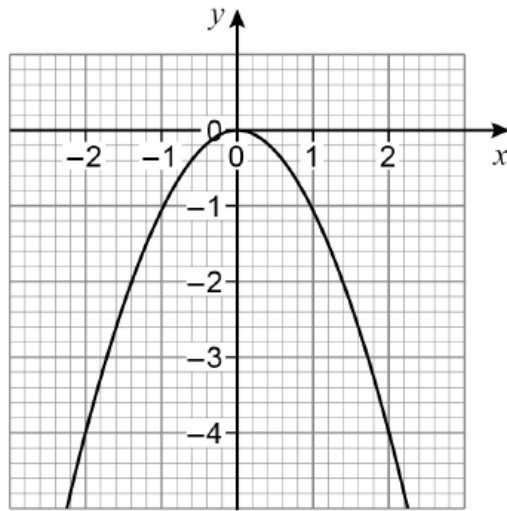


Answer _____



23 (b) Write down the equation of the graph shown.

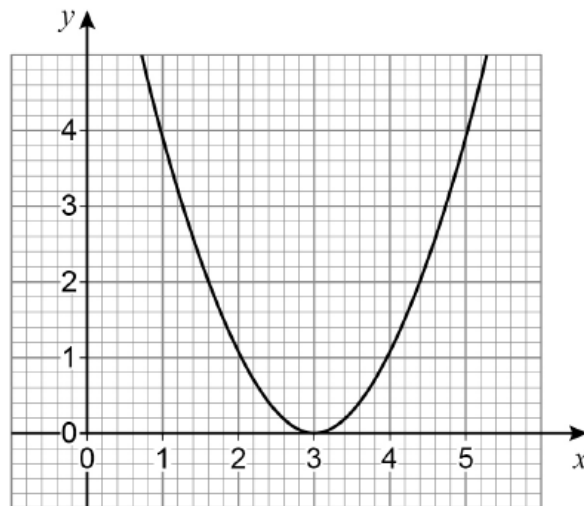
[1 mark]



Answer _____

23 (c) Write down the equation of the graph shown.

[1 mark]



Answer _____

END OF QUESTIONS



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