AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE MATHEMATICS

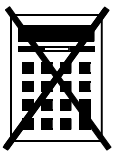
H

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.

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	
TOTAL	

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

Do not write outside the box

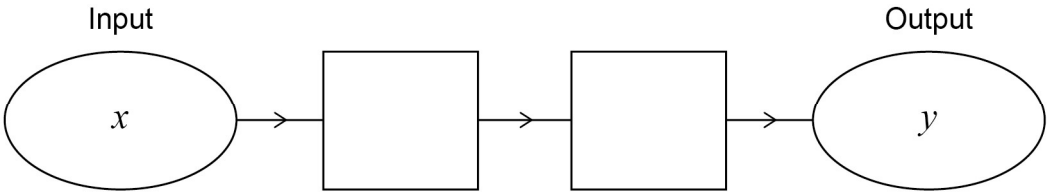
1 Work out the value of 1.5^2

[2 marks]

Answer _____

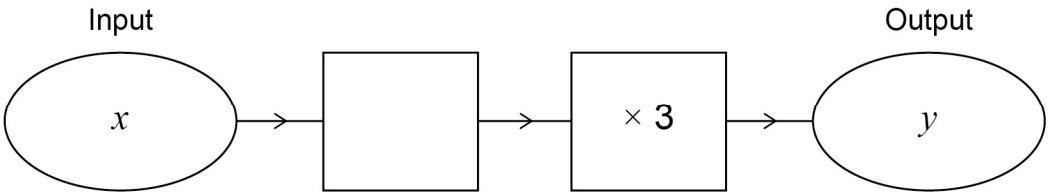
2 (a) Complete this number machine so that $y = 4x + 5$

[1 mark]



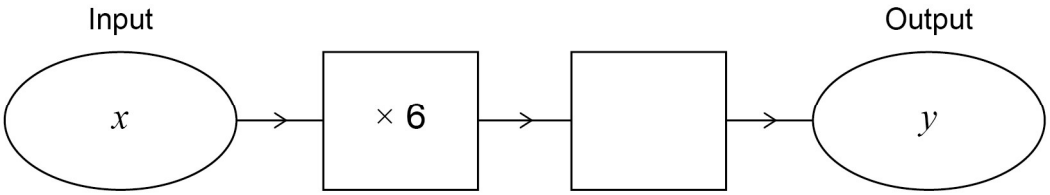
2 (b) Complete this number machine so that $y = 3x - 24$

[1 mark]



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

[1 mark]



Do not write outside the box

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	☐	☐	☐
The median is increased by 10	☐	☐	☐
The range is increased by 10	☐	☐	☐

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.

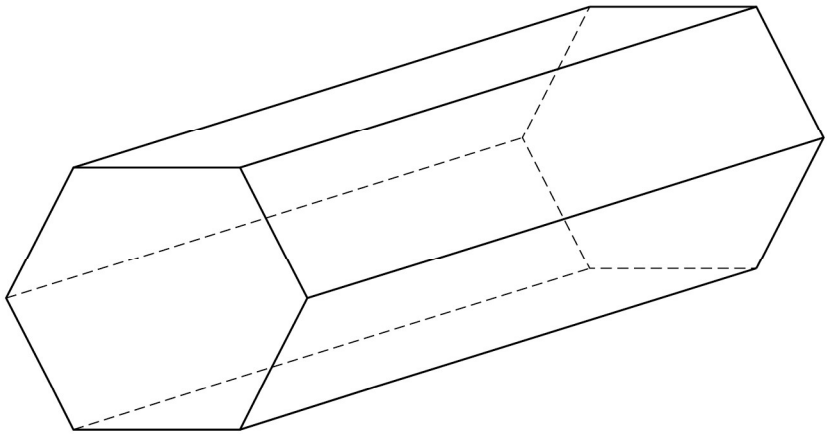
[2 marks]

Answer _____ and _____

11

Do not write outside the box

5 Here is a solid prism.



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

[1 mark]

Answer _____

5 (b) The prism has

volume = 3500 cm^3

and

length = 20 cm

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

[2 marks]

_____

_____

_____

_____

Answer _____ cm^2

Do not write outside the box

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

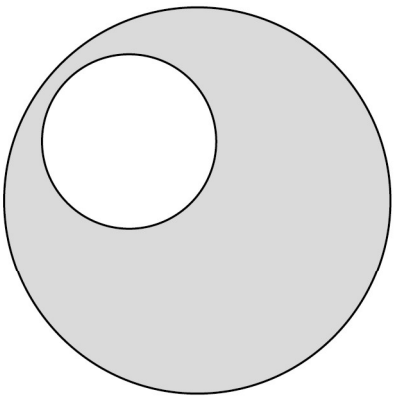
5

Do not write outside the box

7 A large circle and a small circle are shown.

The radius of the large circle is 12 cm

radius of large circle : 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

Do not write outside the box

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

Do not write outside the box

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]

$a =$ _____ $b =$ _____

Do not write outside the box

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**.

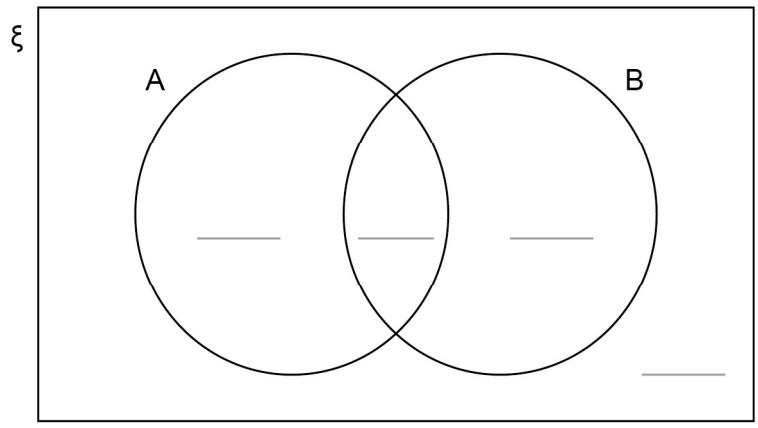
Complete the Venn diagram to represent the information.

[4 marks]

ξ = 150 people

A = people who use shop A

B = people who use shop B



7

Do not write outside the box

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

[3 marks]

Do not write outside the box

12 (a) Convert $\frac{27}{11}$ to a recurring decimal.

[2 marks]

Answer _____

12 (b) Convert $0.1\dot{5}$ to a fraction.

[3 marks]

Answer _____

8

Do not write outside the box

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

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

You **must** show your working.

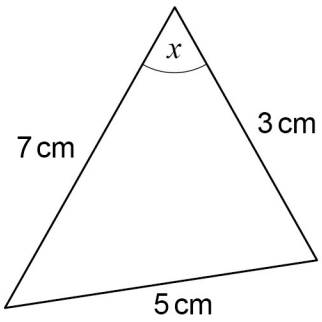
[3 marks]

Answer _____

Do not write outside the box

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.

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

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

$25 = 142 \cos x$

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

Identify **two** errors Sam has made.

[2 marks]

Error 1 _____

_____

_____

Error 2 _____

_____

_____

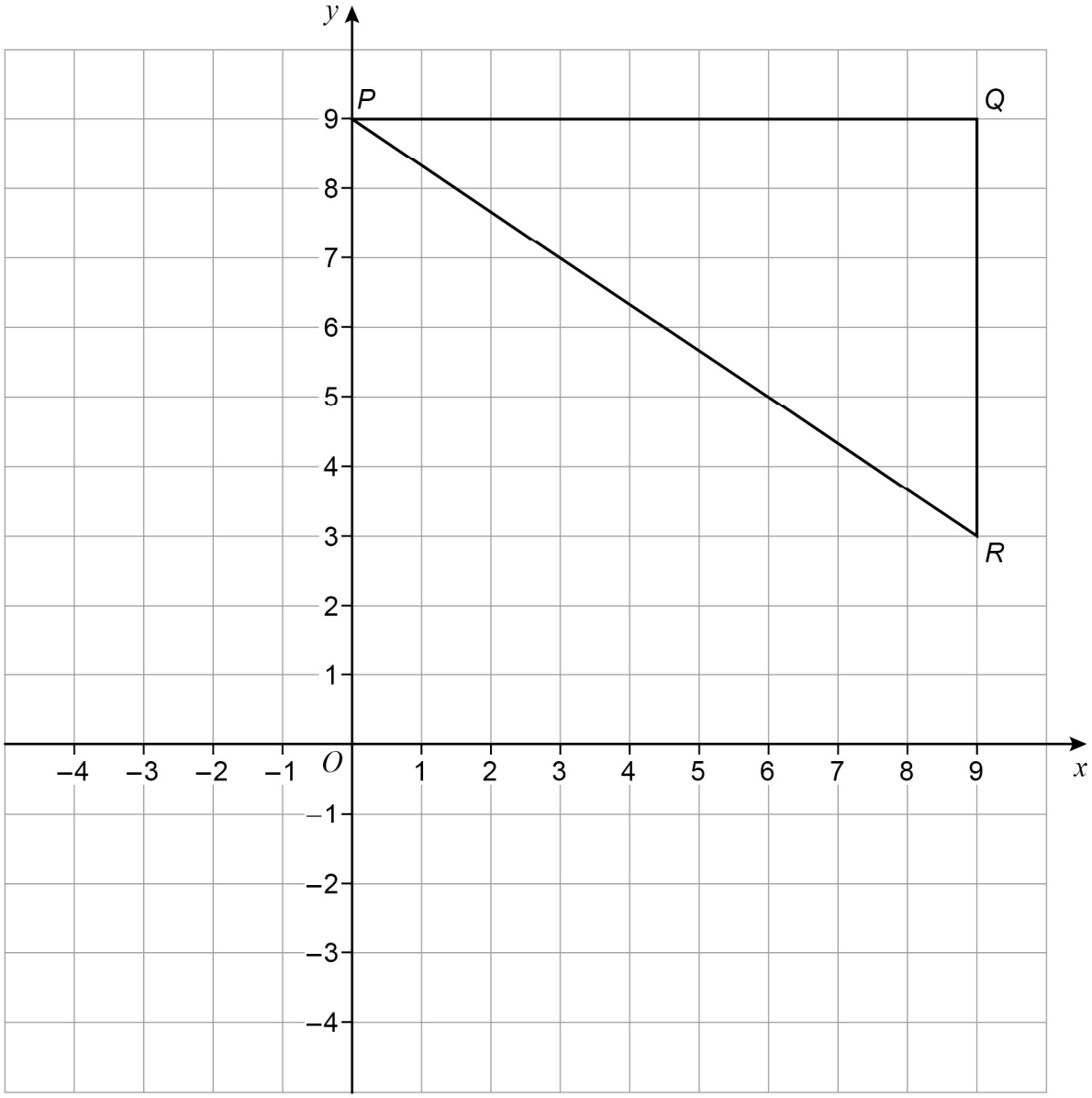
5

Turn over ►

Do not write outside the box

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

[3 marks]



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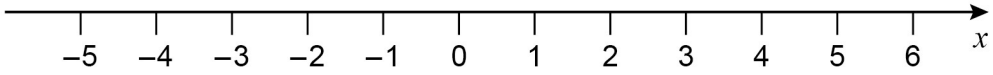
15 (a) Solve the inequality $20 - 5x \leqslant 30$

[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 $7.5 \leqslant w < 8.5$

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

[2 marks]

Reason _____

Correct error interval _____ $\leqslant w <$ _____

9

Turn over ►

Do not write outside the box

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 _____

Do not write outside the box

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

10

Do not write outside the box

19 (a) Expand and simplify fully $(x + 2)(2x + 3)(3x + 4)$

[3 marks]

Answer _____

19 (b) Use your answer from part (a) to work out $102 \times 203 \times 304$

[2 marks]

Answer _____

Do not write outside the box

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

9

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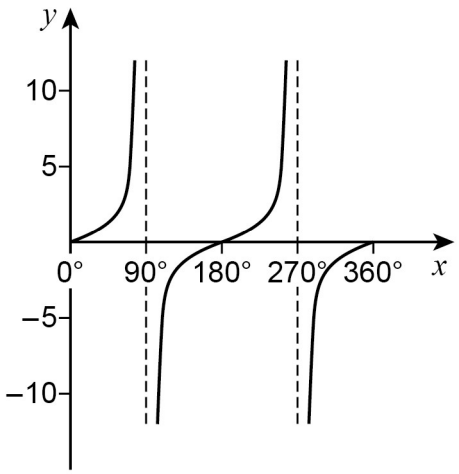
21 Here is a sketch of the graph of $y = \tan x$ where $0° \leqslant x \leqslant 360°$



You are given that **tan 78.69° = 5**

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

[1 mark]

Answer _____ °

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

[2 marks]

Answer _____ ° and _____ °

Do not write outside the box

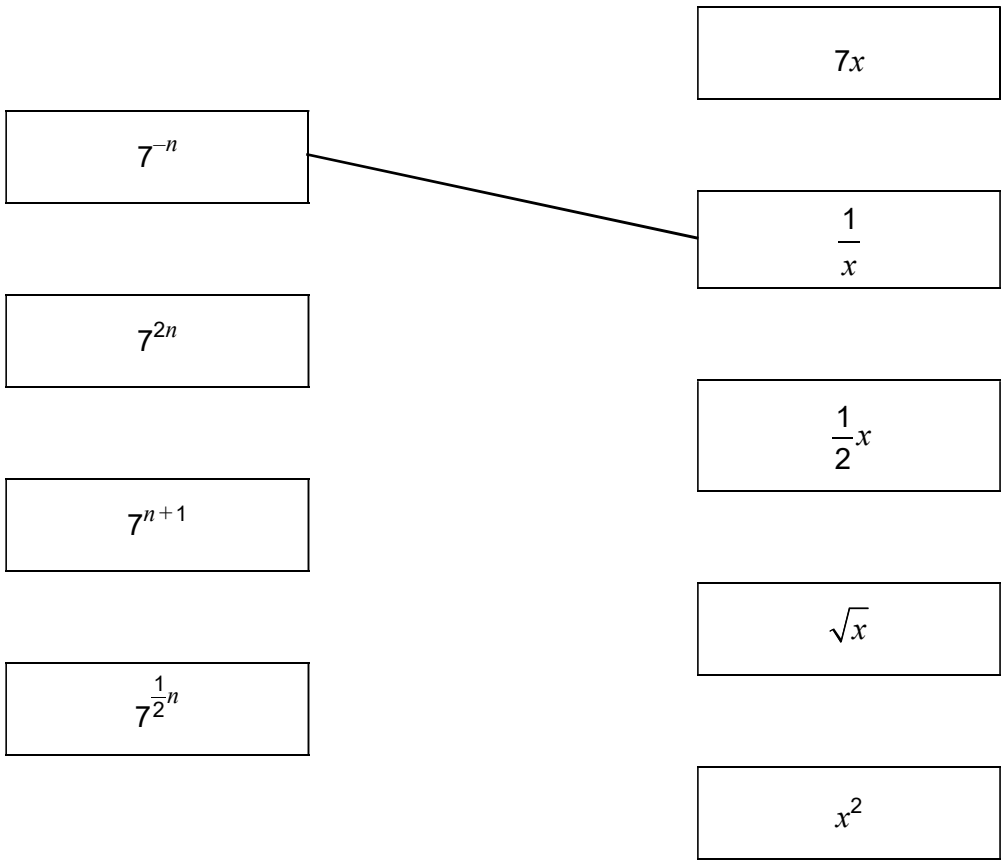
22

$7^n = x$

Match each expression on the left to the correct expression on the right.

One has been done for you.

[3 marks]



Turn over for the next question

6

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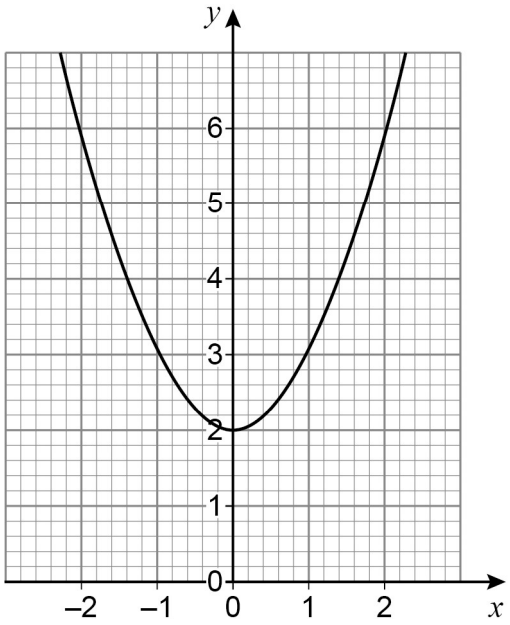
23 In each part, the graph shown is a transformation of the graph $y = x^2$

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

[1 mark]

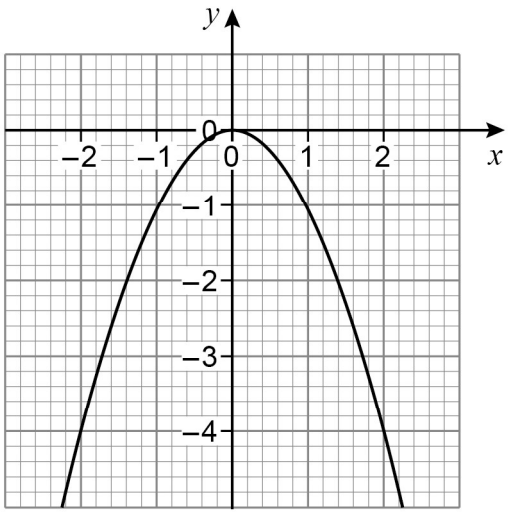


Answer _____

Do not write outside the box

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

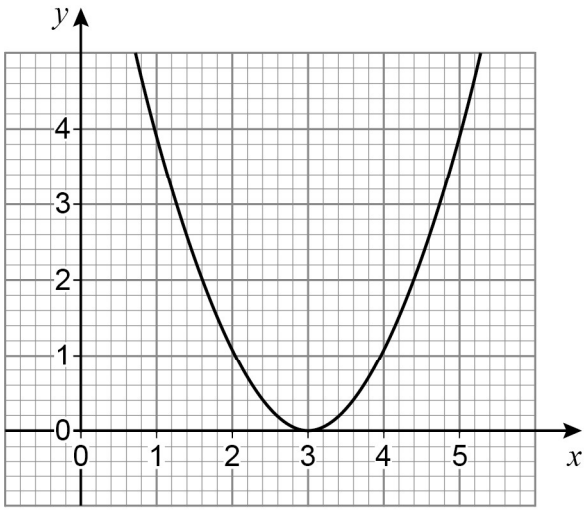
[1 mark]



Answer _____

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

[1 mark]



Answer _____

END OF QUESTIONS

3

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