AQA

GCSE
MATHEMATICS

H

Higher Tier   Paper 1 Non-Calculator

Shadow paper based on June 2024 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	
22–23	
24	
TOTAL	

8300/1H

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

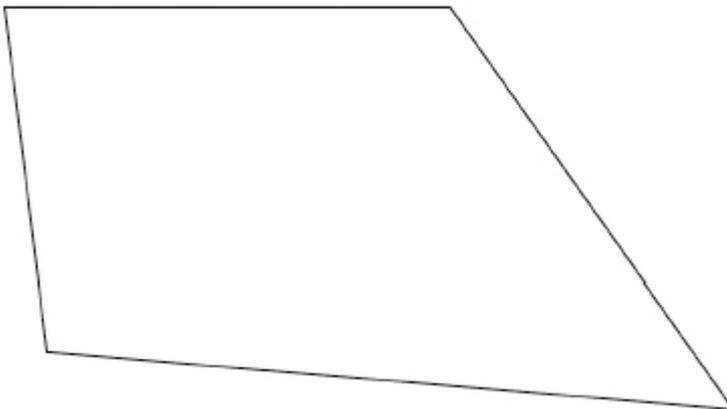**1** Work out $6^2 \div \left(\dfrac{1}{3} \times \sqrt{81} \right)$

[3 marks]

Answer _____

2 Here is a quadrilateral.

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

[1 mark]

Answer _____ °

3 The vector $\begin{pmatrix} 2 \\ -8 \end{pmatrix}$ translates A to B.

Write down the vector that translates B to A.

[1 mark]

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

4 The attendance for a shop opening is 5800 people to the nearest 100

4 (a) Write down the minimum possible attendance.

[1 mark]

Answer _____

4 (b) Write down the maximum possible attendance.

[1 mark]

Answer _____

Turn over for the next question

7

Turn over ▶

5   54 students in a college play in bands.

       24 play the guitar.

       $\dfrac{1}{4}$ of the students who play the guitar also sing

       70% of the students who do **not** play the guitar are singers

5 (a) ξ = students in bands

       G = plays the guitar

       S = singer
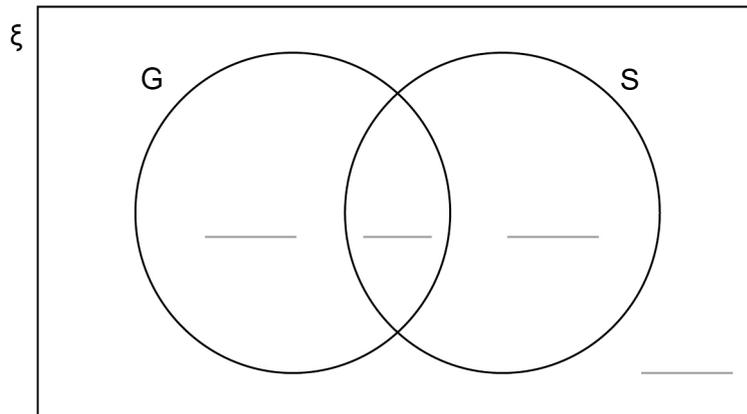
Complete the Venn diagram.

[3 marks]

5 (b)   A student who sings is chosen at random.

       Work out the probability that the student plays the guitar.

[1 mark]

       Answer _____

     8300/1H

6 The table shows the number of students on a course in different years.

Year	2016	2017	2018	2019	2020	2021	2022	2023
Number of workers	27	31	40	49	60	71	77	82

A time-series graph is drawn to represent the data.

The first four points have been plotted.
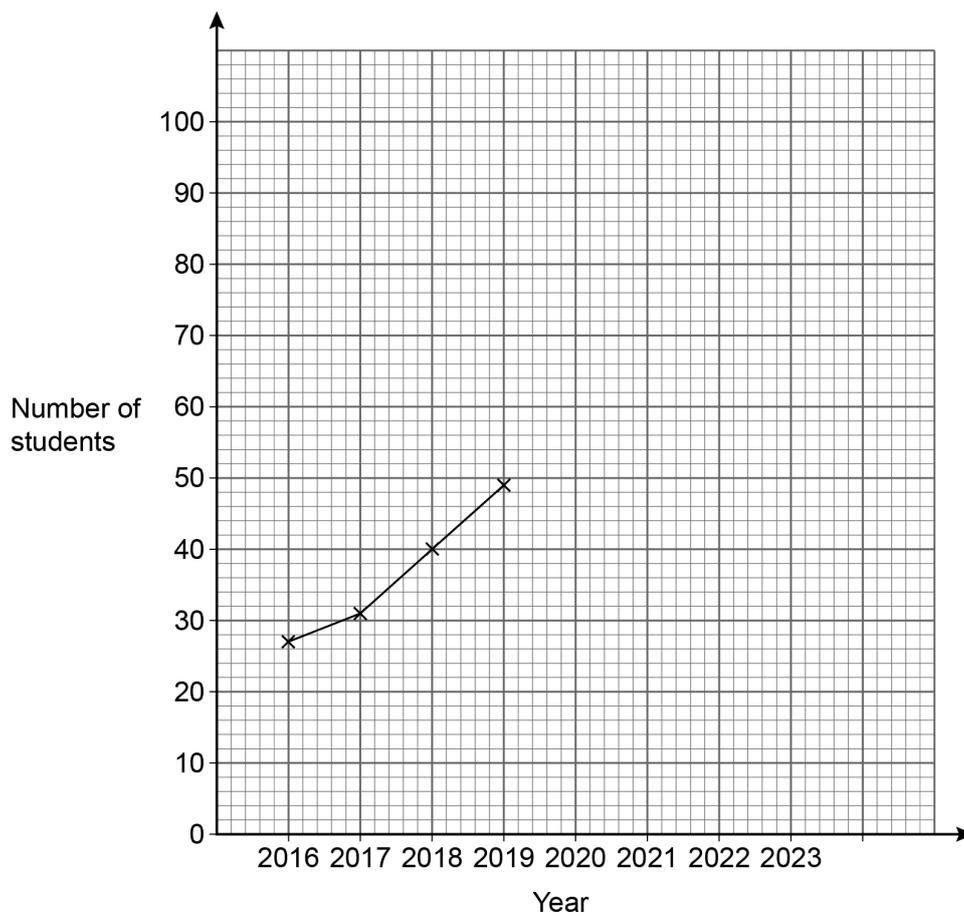
6 (a) Complete the graph.

[2 marks]

6 (b) Estimate the number of students on the course in 2024.

[1 mark]

Answer _____

7

Turn over ▶

8300/1H

7 Here is a cone.
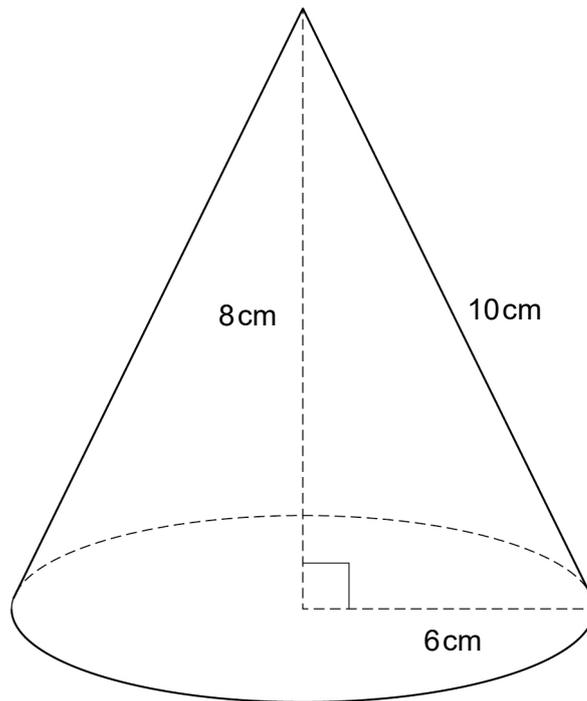
7 (a)

> Curved surface area of a cone = πrl
>
> where r is the radius and l is the slant height

Belinda tries to work out the curved surface area in terms of π

> Curved surface area of the cone = π × 6 × 8
>
> = 48π cm^2

What mistake has she made?

[1 mark]

_____

_____

7 (b) Adrian uses $\pi = 3$ to estimate the area of the **base** of the cone.

Work out his estimate.

[2 marks]

Answer _____ cm^2

7 (c) Belinda uses $\pi = 3.14$ to estimate the area of the **base** of the cone.

Is Belinda's estimate more than or less than Adrian's estimate?

Tick a box.

More than ☐   Less than ☐

Give a reason for your answer.

[1 mark]

Turn over for the next question

4

Turn over ▶

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8 Solve $8x - 19 = 4x + 29$

[3 marks]

$x =$ _____

9 In a gallery

the area of the largest room is $38\,m^2$

the area of the smallest room is $17.2\,m^2$

Express the area of the largest room as a fraction of the area of the smallest.

Give your answer in its simplest form.

[3 marks]

Answer _____

10 (a) Represent $-3 < x < 1$ on the number line.

[1 mark]
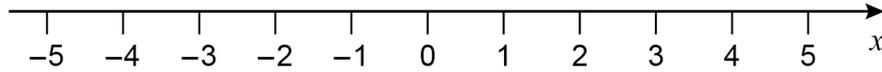
10 (b) Solve $4y + 10 \geqslant 5$

[2 marks]

Answer _____

Turn over for the next question

9

Turn over ▶

11

Describe fully the **single** transformation that maps triangle *A* to triangle *B*.
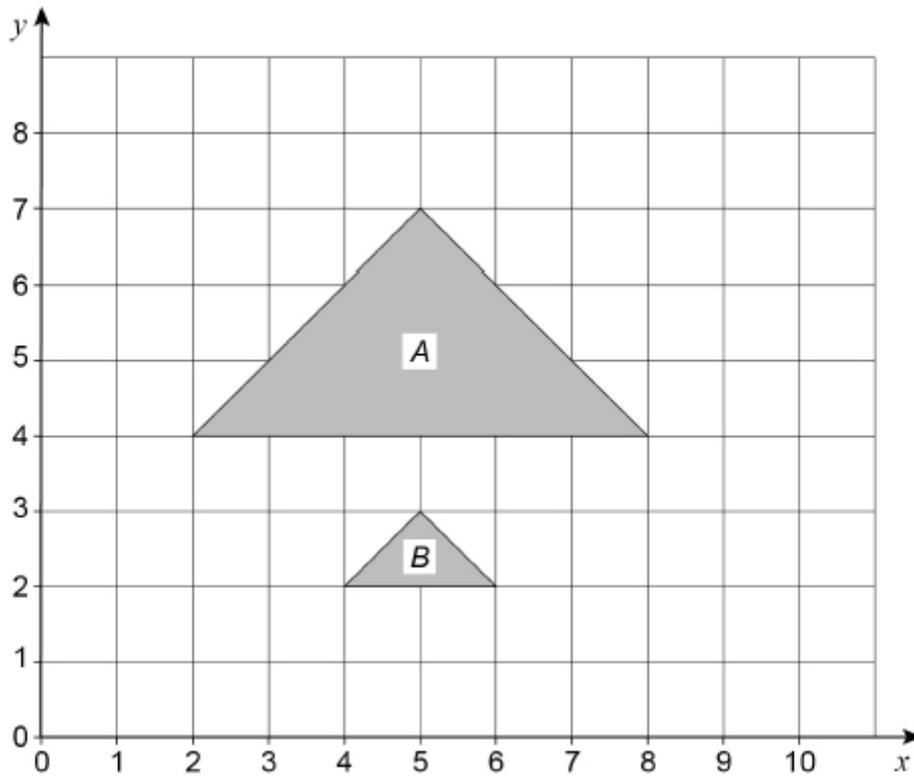
Describe fully the **single** transformation that maps shape A to shape B.

[3 marks]

12 A sector has radius

Not drawn accurately

40°

18 cm

Work out the length of the arc.

Give your answer in terms of π

[3 marks]

Answer _____ cm

Turn over for the next question

6

Turn over ▶

13   *ABCDE* is a pentagon with $AB = 8$ cm

- $BC = 6$ cm

- *AB* and *BC* are perpendicular.

- *AB* and *DC* are equal **and** parallel.

- Area of the pentagon $= 63$ cm^2

- The pentagon has exactly **one** line of symmetry.

Complete a **labelled** drawing of the pentagon.

[4 marks]
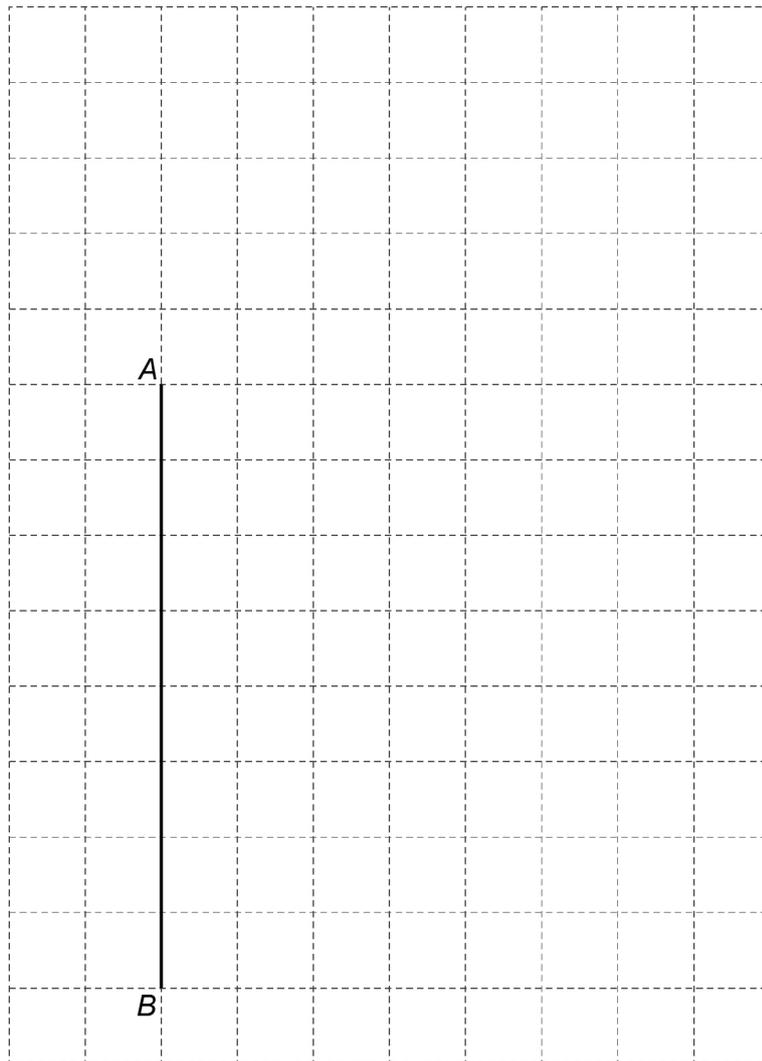
14   7 cups of tea and 2 packets of biscuits cost £10

6 cups of tea and 4 packets of biscuits cost £9.60

Work out the cost of a cup of tea and the cost of a packet of biscuits.

[4 marks]

cup of tea _____

packet of
biscuits _____

Turn over for the next question

8

Turn over ▶

15 (a) Estimate the square root of 56

[1 mark]

15 (b) Use approximations to estimate the answer to

$$\frac{\sqrt{97} + 2.014^3}{0.49}$$

[3 marks]

16   A race was run in 2022 and 2023. The table shows information about the finishing times in minutes.

	Median time	**Interquartile range of times**
Race 2022	22.5	8
Race 2023	24	6

Compare the average time and consistency of times for the two races.

[2 marks]

Average _____

_____

_____

Consistency _____

_____

_____

Turn over for the next question

6

Turn over ▶

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17 Rearrange $y = \dfrac{4x - 5}{2x}$ to make x the subject.

[4 marks]

Answer _____

18 A circle has centre O and passes through (0, -4)
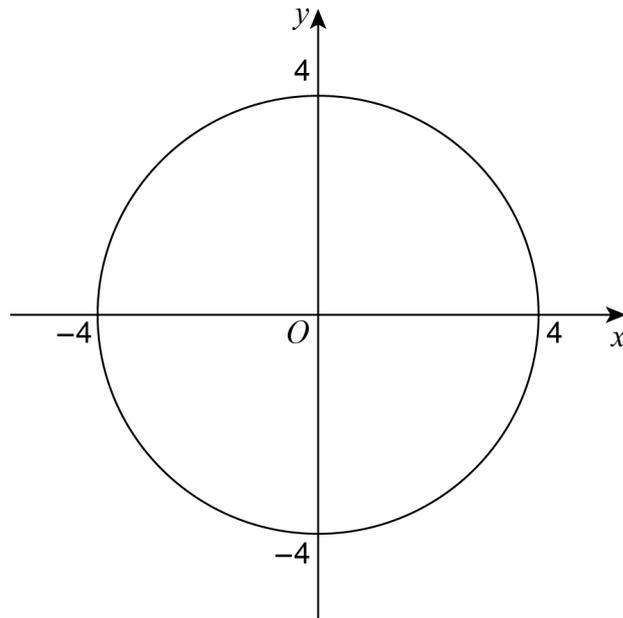
Write down the equation of the circle.

[1 mark]

Answer _____

Turn over for the next question

Turn over ▶

8300/1H

19 *A*, *B* and *C* are numbers.

Here is some information about *B* and *C*.

B	$\frac{5}{4}$ of *A*
C	*A* **increased** by 250%

Work out *C* as a fraction of *B*.

[4 marks]

Answer _____

20 $(x + 5)(x + 2)(x + a) \equiv x^3 + bx^2 + cx - 30$

Work out the values of the integers a, b and c.

[3 marks]

$a =$ _____ $b =$ _____ $c =$ _____

Turn over for the next question

7

Turn over ▶

21 Prove algebraically that $3.4\dot{7} = \dfrac{313}{90}$

[3 marks]

22 B, X, Y and Z are points on the circumference of a circle.
ABC is a tangent to the circle.
BX is parallel to ZY.

Not drawn accurately
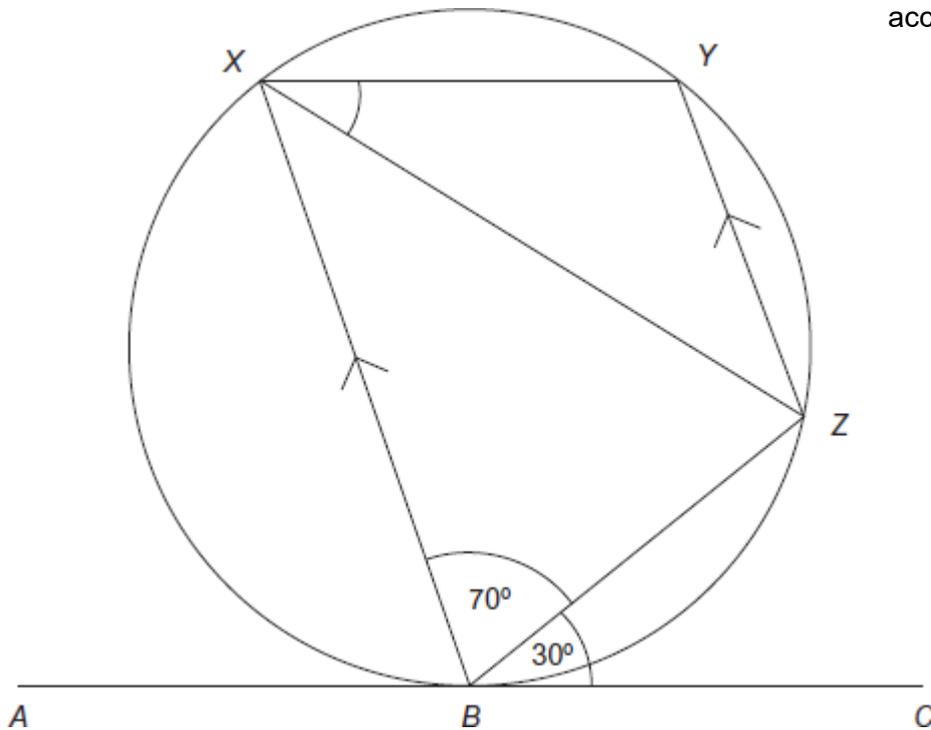
Work out the size of angle ZXY.

You **must** show your working, which may be on the diagram.

[3 marks]

Answer _____ °

6

Turn over ▶

     8300/1H

23 (a) The first three terms of a geometric progression are $\dfrac{\sqrt{7}}{2}$ $\dfrac{7}{4}$ $\dfrac{7\sqrt{7}}{8}$

Work out the next term.

[1 mark]

Answer _____

23 (b) The nth term of a sequence is $\left(1+\sqrt{5}\right)^{n}$

Show that the third term is $16+8\sqrt{5}$

[3 marks]

24 (a) Prove that the sum of three consecutive numbers is a multiple of 3

[3 marks]

Answer _____

24 (b) x is an integer.

Prove that $18 + (x+1)^2 + 2(2x-5)$ is a square number

[4 marks]

11

Turn over ▶

25   Show that the value of $10 \cos 60° + 8 \sin 60° ÷ 2 \tan 60°$ is an integer.

[4 marks]

END OF QUESTIONS

Shadow paper based on June 2024 question paper

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ANSWER IN THE SPACES PROVIDED

Shadow paper based on June 2024 question paper

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Question number	Additional page, if required. Write the question numbers in the left-hand margin.

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