



Surname _____

Forename(s) _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

I declare this is my own work.

GCSE

MATHEMATICS

H

Higher Tier

Paper 1 Non-Calculator

8300/1H

Thursday 16 May 2024

Morning

Time allowed: 1 hour 30 minutes

At the top of the page, write your surname and forename(s), your centre number, your candidate number and add your signature.

[Turn over]

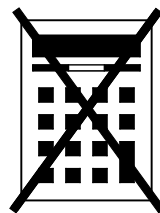


J U N 2 4 8 3 0 0 1 H 0 1

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.
- Answer **ALL** questions.
- You must answer the questions in the spaces provided. Do not write 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.

DO NOT TURN OVER UNTIL TOLD TO DO SO



Answer ALL questions in the spaces provided.

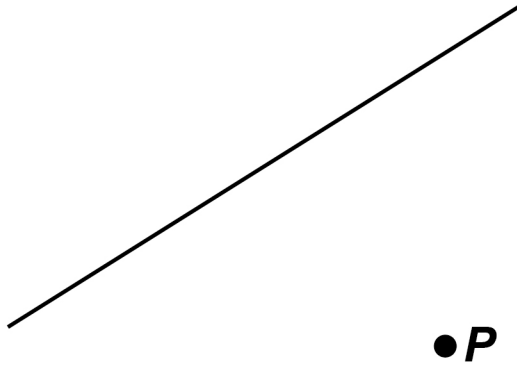
1 **Work out** $12^2 \div \left(\frac{1}{3} \times \sqrt{36} \right)$ **[3 marks]**

Answer _____



- 2 Measure the **SHORTEST** distance from point *P* to the line.

Give your answer in millimetres. [1 mark]



Answer _____ mm

[Turn over]



3 The vector $\begin{pmatrix} -3 \\ 7 \end{pmatrix}$ 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 rugby match is 8400 people to the nearest 100**

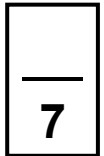
4 (a) **Write down the minimum possible attendance.**
[1 mark]

Answer _____

4 (b) **Write down the maximum possible attendance.**
[1 mark]

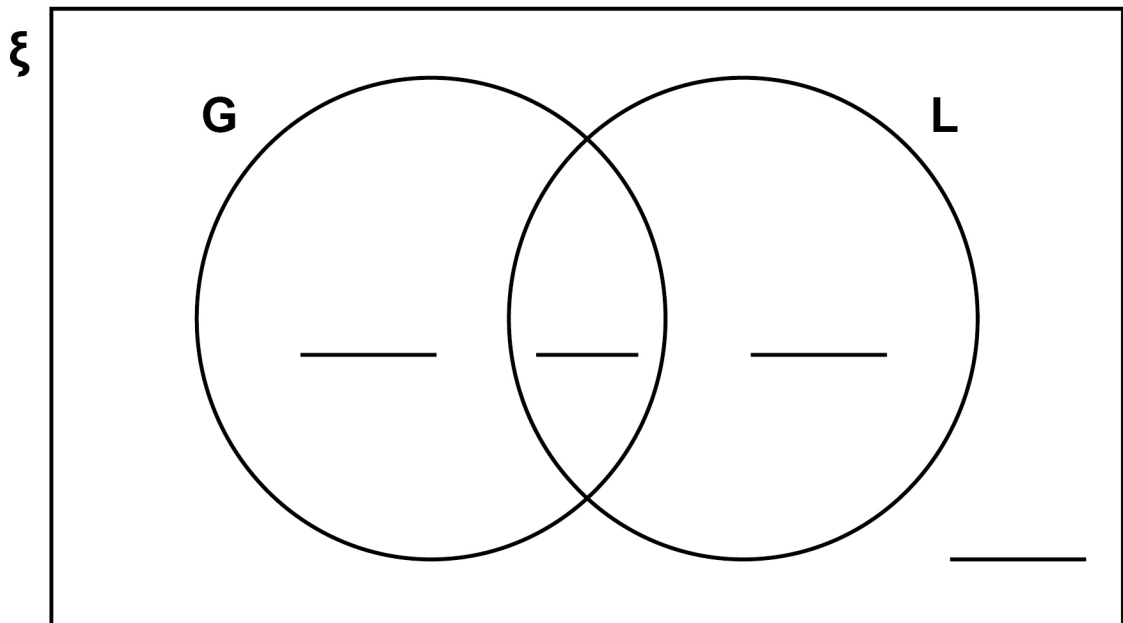
Answer _____

[Turn over]



- 5** **A school year has 78 students.**
28 wear glasses.
 $\frac{1}{4}$ **of the students who wear glasses are**
left-handed.
30% of the students who do NOT wear glasses
are left-handed.

- 5 (a)** ξ = students in the school year
G = wears glasses
L = left-handed



Complete the Venn diagram, on the opposite page. [3 marks]

5 (b) A left-handed student is chosen at random.

Work out the probability that the student wears glasses. [1 mark]

Answer _____

[Turn over]



- 6** The table shows the number of workers at a company in different years.

YEAR	NUMBER OF WORKERS
2015	29
2016	34
2017	42
2018	52
2019	62
2020	70
2021	76
2022	80

A time-series graph, on the opposite page, is drawn to represent the data.

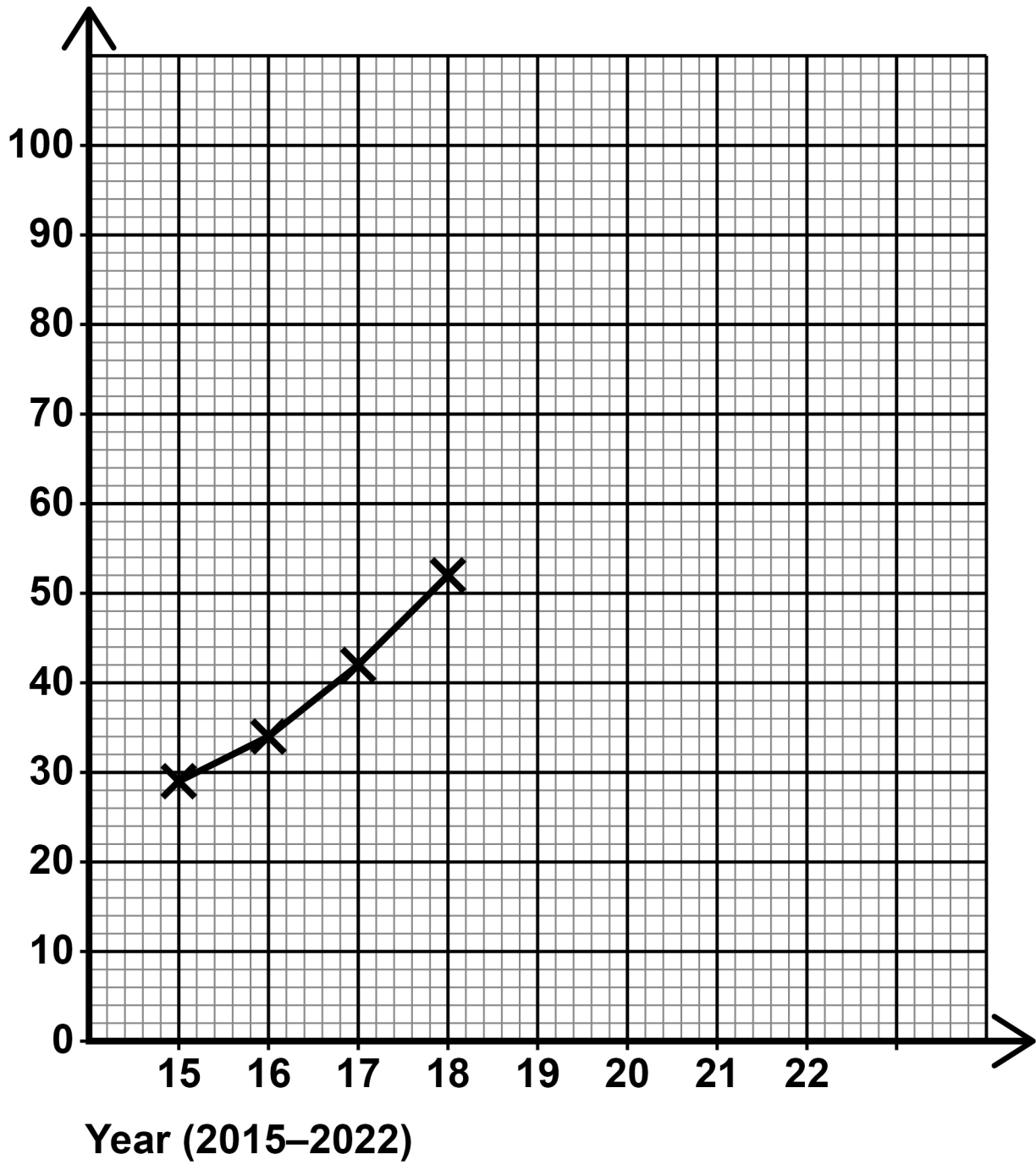
The first four points have been plotted.

- 6 (a)** Complete the graph. [2 marks]
- 6 (b)** Estimate the number of workers at the company in 2023. [1 mark]

Answer _____



Number of
workers



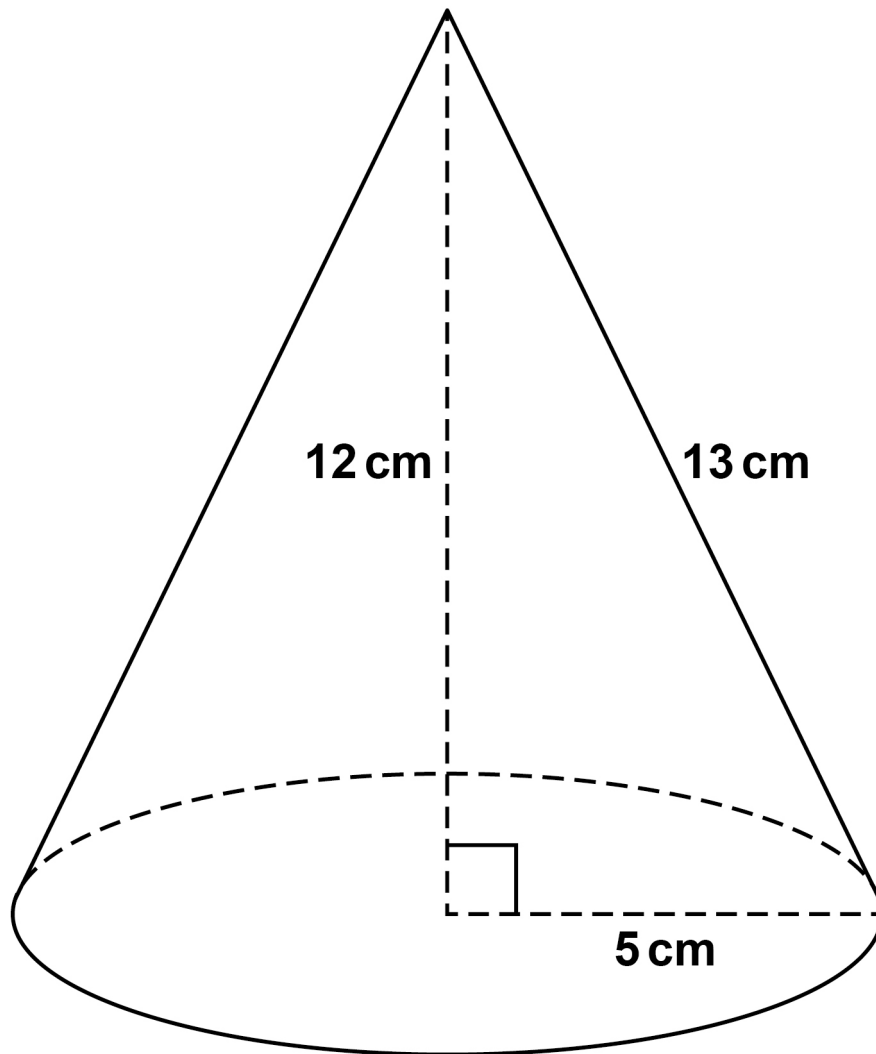
[Turn over]

7



7

Here is a cone.



7 (a)

Curved surface area of a cone = $\pi r l$ where r is the radius and l is the slant heightBeth tries to work out the curved surface area in terms of π

Curved surface area of the cone

$$= \pi \times 5 \times 12$$

$$= 60\pi \text{ cm}^2$$



What mistake has she made? [1 mark]

- 7 (b) Adam uses $\pi = 3$ to estimate the area of the BASE of the cone.**

Work out his estimate. [2 marks]

Answer _____ **cm²**

[Turn over]



- 7 (c) Beth uses $\pi = 3.14$ to estimate the area of the BASE of the cone.

Is Beth's estimate more than or less than Adam's estimate?

Tick a box.

☐

More than

☐

Less than

Give a reason for your answer. [1 mark]

4



8 Solve $7x - 22 = 4x + 29$ [3 marks]

$x =$ _____

[Turn over]



9

In a house

the floor area of the living room is 26 m^2

the floor area of the kitchen is 16.4 m^2

Express the area of the living room as a fraction of the area of the kitchen.

Give your answer in its simplest form. [3 marks]



Answer _____

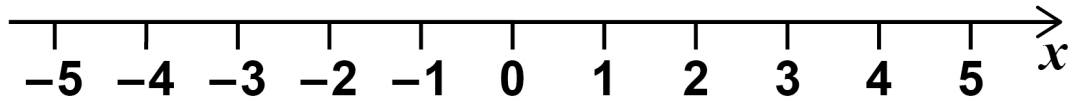
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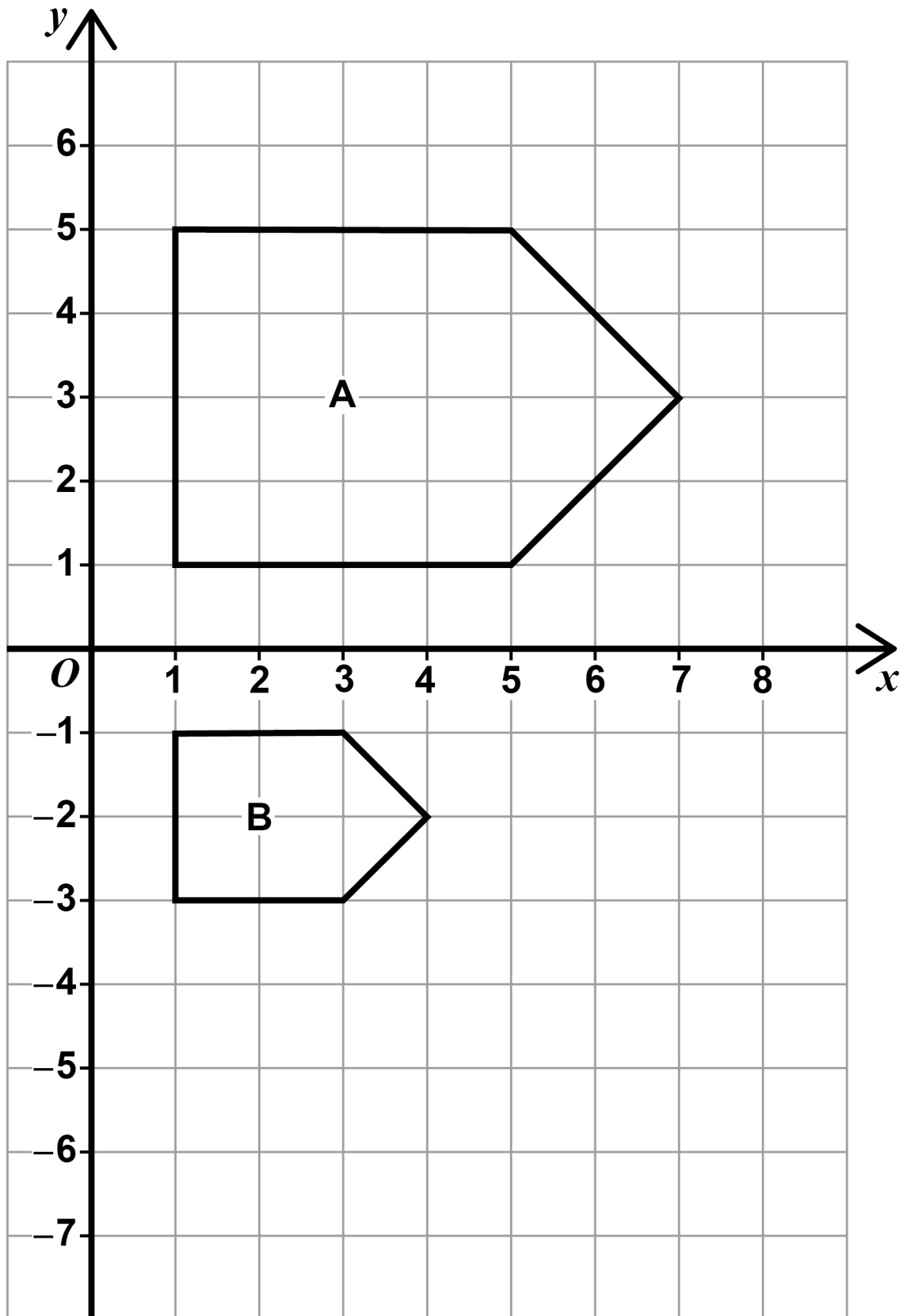
- 10 (a) Represent $-2 < x < 4$ on the number line.
[1 mark]



- 10 (b) Solve $5y + 14 \geq 11$ [2 marks]

Answer _____

[Turn over]



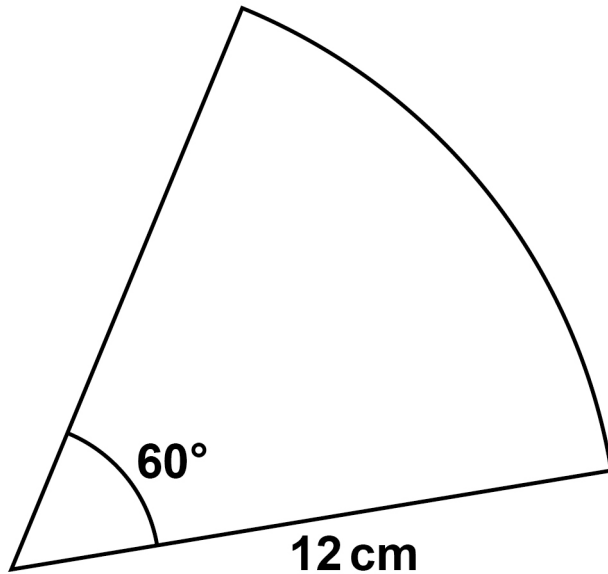
Describe fully the SINGLE transformation that maps shape A to shape B. [3 marks]

[Turn over]



- 12 A sector has radius 12 cm and angle 60°

The diagram is not drawn accurately.



Work out the length of the arc.

Give your answer in terms of π [3 marks]

Answer _____ cm

[Turn over]

6

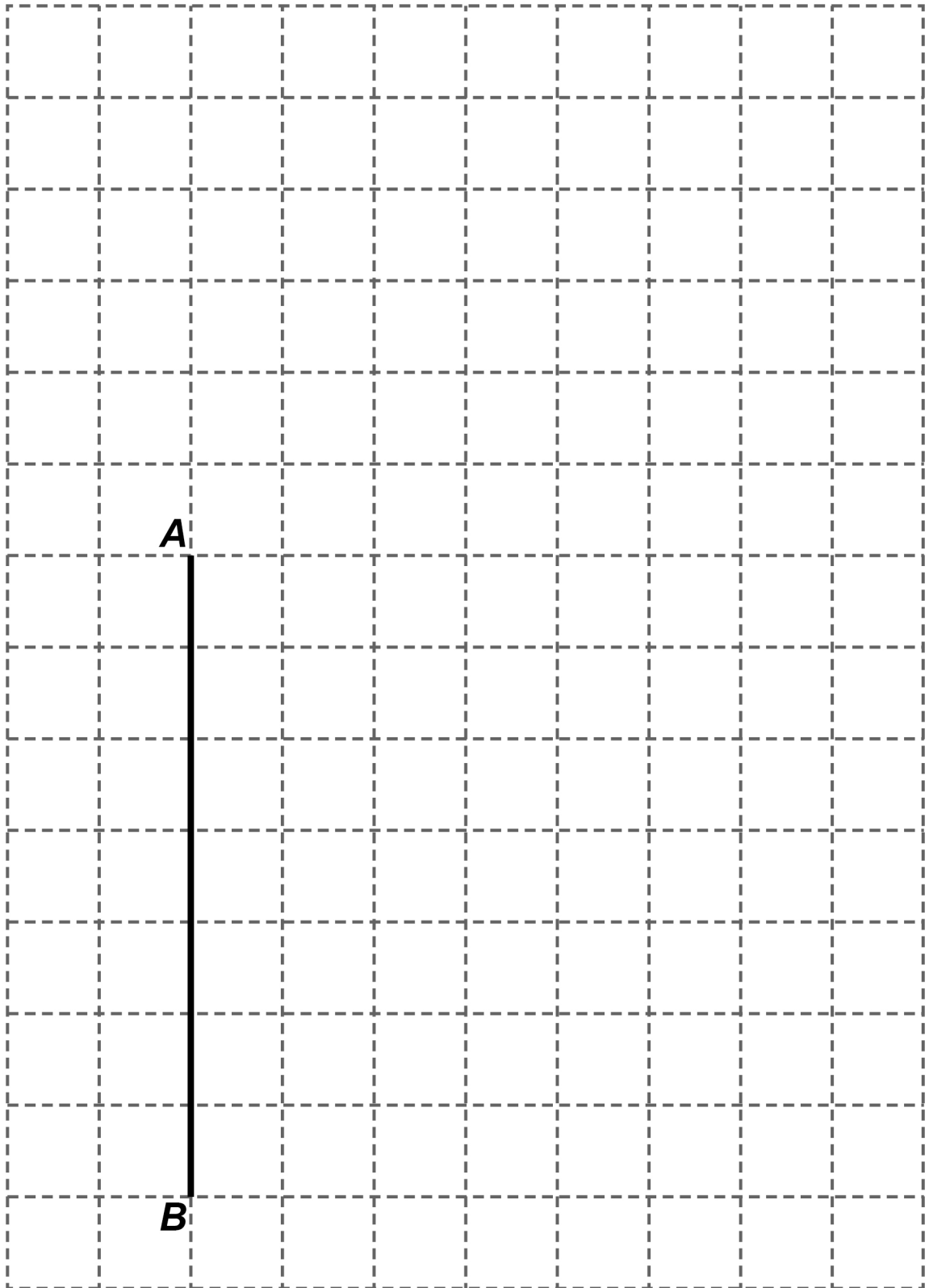


13 ***ABCDE*** is a pentagon with ***AB* = 7 cm**

- ***BC* = 6 cm**
- ***AB* and *BC* are perpendicular.**
- ***AB* and *DC* are equal AND parallel.**
- **Area of the pentagon = 54 cm²**
- **The pentagon has exactly ONE line of symmetry.**

On the opposite page, complete a LABELLED drawing of the pentagon. [4 marks]





[Turn over]



**14 4 chocolate bars and 3 packets of mints cost
£4.70**

**5 chocolate bars and 1 packet of mints cost
£4.50**

**Work out the cost of a chocolate bar and the cost
of a packet of mints. [4 marks]**



chocolate bar _____

packet of mints _____

[Turn over]

8



- 15 (a) Between which two CONSECUTIVE integers does the square root of 210 lie? [1 mark]

Answer _____ and _____



15 (b) Here are two calculations, A and B.

A

$$1.92^7 + 6.9^3$$

B

$$5 \times \sqrt[3]{1000\,350}$$

Use approximations to show that
answer to A < answer to B [3 marks]

[Turn over]



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- 16 The table shows information about the ages of members of two clubs.

	MEDIAN AGE (YEARS)	INTERQUARTILE RANGE OF AGES (YEARS)
Swimming club	21.2	7.3
Cycling club	29.7	4.6

Compare the average age and consistency of ages for the members of the two clubs. [2 marks]

Average _____

Consistency _____

[Turn over]



17 Rearrange $y = \frac{3x+7}{x}$ to make x the subject.
[4 marks]

[illegible]

Answer _____

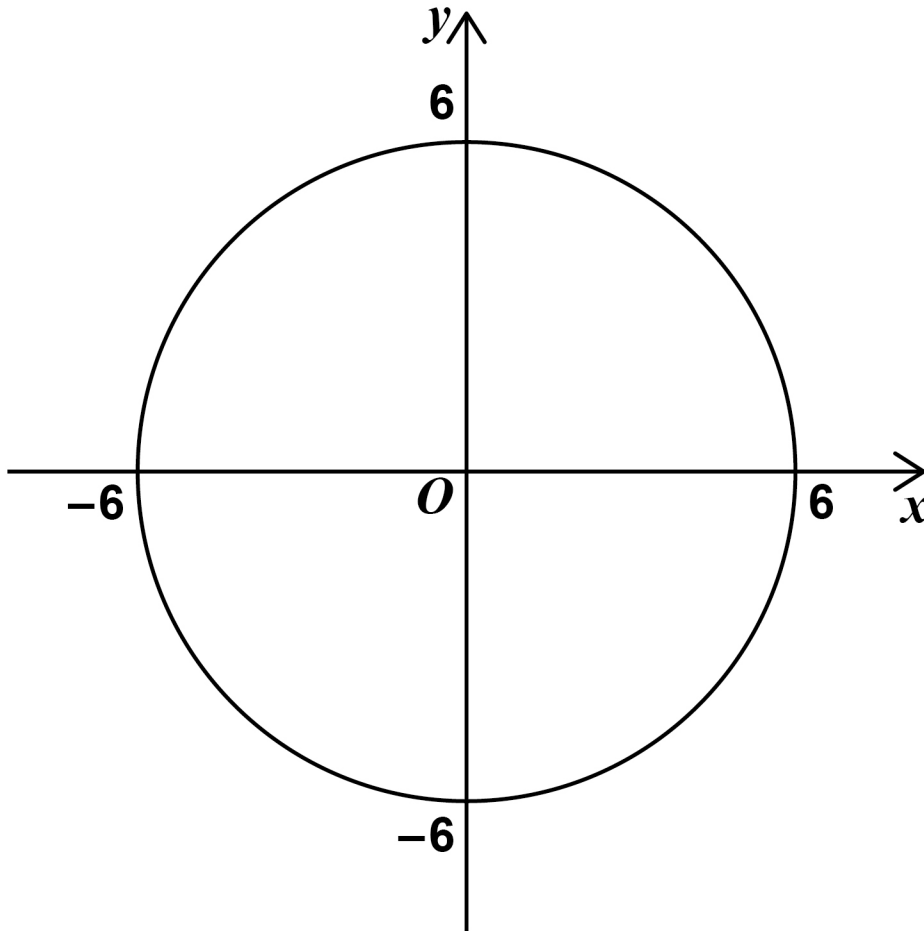
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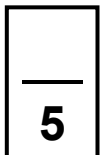
- 18 A circle has centre O and passes through $(0, 6)$



Write down the equation of the circle. [1 mark]

Answer _____

[Turn over]



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

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

<i>B</i>	$\frac{7}{4}$ of <i>A</i>
<i>C</i>	<i>A</i> INCREASED by 150%

Work out *C* as a fraction of *B*. [4 marks]

Answer _____

[Turn over]



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$$\mathbf{20} \quad 5x^3 + ax^2 + bx + c \equiv kx^3 + (2 - k)x^2 + (a^2 - 1)x + \frac{b}{2}$$

Work out the values of a , b and c . [3 marks]

[illegible]

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

[Turn over]



21 Prove algebraically that $1.\dot{0}\dot{1}\dot{8} = \frac{56}{55}$ [3 marks]

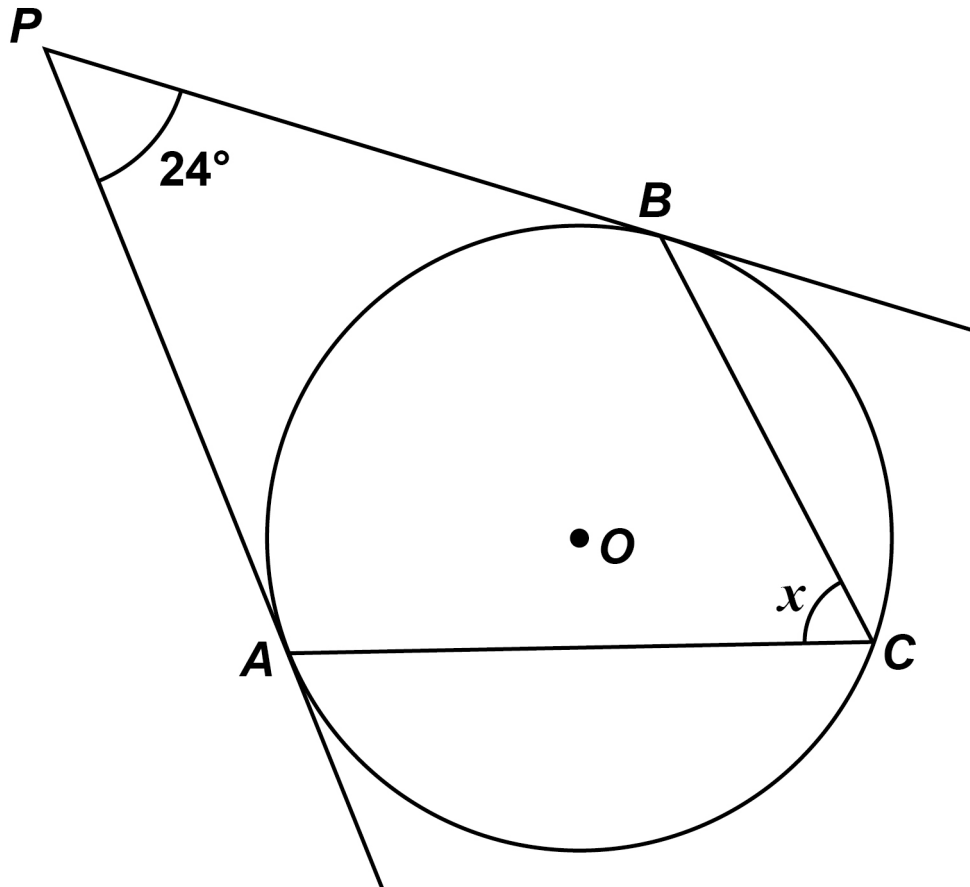
[illegible]

[Turn over]



- 22 A , B and C are points on a circle, centre O .
 AP and BP are tangents to the circle.

The diagram is not drawn accurately.



Work out the size of angle x . [3 marks]

Answer _____ °

[Turn over]

6



- 23 (a) The first three terms of a geometric progression are $\frac{\sqrt{5}}{2}$ $\frac{5}{4}$ $\frac{5\sqrt{5}}{8}$

Work out the next term. [1 mark]

Answer

- 23 (b) The n th term of a sequence is $(2 + \sqrt{3})^n$

Show that the third term is $26 + 15\sqrt{3}$
[3 marks]



[Turn over]



24 (a) $9k + 7$ and $2k^2 + 3$ are consecutive integers.

$9k + 7$ is the smaller integer.

Work out the value of the NEXT consecutive integer. [5 marks]

[illegible]

Answer

24 (b) x is a square number.

Show that the NEXT square number is
 $x + 2\sqrt{x} + 1$ [2 marks]

[Turn over]



25 Show that the value of $6 \sin 30^\circ + 2 \cos 30^\circ \times 4 \tan 30^\circ$ is an integer.
[4 marks]

[illegible]

END OF QUESTIONS

4



Additional page, if required.

Write the question numbers in the left-hand margin.

[illegible]

Additional page, if required.

Write the question numbers in the left-hand margin.

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For Examiner's Use	
Pages	Mark
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8–11	
12–14	
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TOTAL	

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