OXFORD AQA

INTERNATIONAL QUALIFICATIONS

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I declare this is my own work.

INTERNATIONAL GCSE

MATHEMATICS

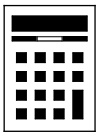
E

Extension Tier Paper 1E

Thursday 16 May 2024 07:00 GMT Time allowed: 2 hours

Materials

For this paper you must have:



- a calculator
- mathematical instruments.

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 100.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.
- If your calculator does not have a π button, take the value of π to be 3.142

Advice

Show all necessary working; otherwise marks for method may be lost.

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	
24–25	
26–27	
28	
TOTAL	

Do not write outside the box

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

1 Here is a list of units.

m/s m/s^2 m/s^3 kg/m kg/m^2 kg/m^3

1 (a) Write down the unit of speed.

[1 mark]

Answer _____

1 (b) Write down the unit of density.

[1 mark]

Answer _____

2 The **area** of a circle in cm^2 is $\frac{81}{16}\pi$

Work out the **diameter**.

[2 marks]

_____

_____

_____

Answer _____ cm

Do not write outside the box

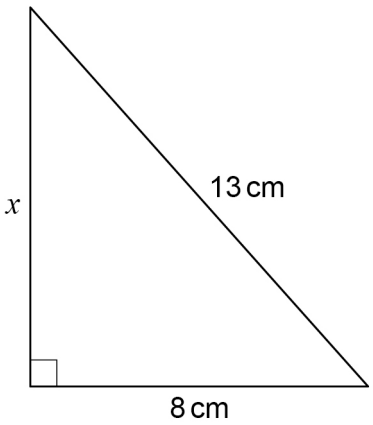
3 Windows in a building are in the ratio open : closed = 5 : 3

What fraction of the windows are **closed**?

[1 mark]

Answer _____

4



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Use Pythagoras' theorem to work out the value of x.

Give your answer as a decimal.

[3 marks]

$x =$ _____ cm

8

Do not write outside the box

5 A group of 8 people has a mean mass of 75 kg

A 9th person joins the group and the mean mass increases by 2 kg

Work out the mass of the 9th person.

[3 marks]

Answer _____ kg

6 For company A and company B, the **total** cost of a taxi journey is

a fixed cost

and

a cost per kilometre.

6 (a) Company A uses this formula to work out the total cost, $\$C$, of a journey of d kilometres.

$$C = \frac{14 + 5d}{4}$$

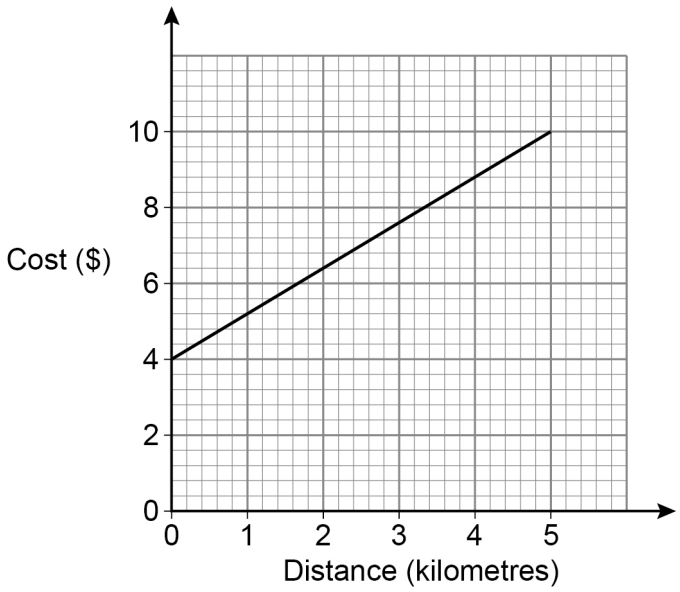
Complete the following statement for company A.

[2 marks]

The fixed cost is $ _____ and the cost per kilometre is $ _____

Do not write outside the box

6 (b) The costs of journeys up to 5 kilometres with company B are represented by the graph.



Work out the cost of a journey of 12 kilometres with company B.

[3 marks]

Answer $ _____

8

Turn over ►

Do not write outside the box

7 Solve these simultaneous equations.

$3x + y = 25$

$x - y = 6$

[3 marks]

$x =$ _____ $y =$ _____

Do not write outside the box

8 (a) Solve $2(x - 7) \leqslant 30$

[2 marks]

Answer _____

8 (b) Work out the **integer** solutions to $-9 < 3y \leqslant 6$

[2 marks]

Answer _____

Turn over for the next question

7

Do not write outside the box

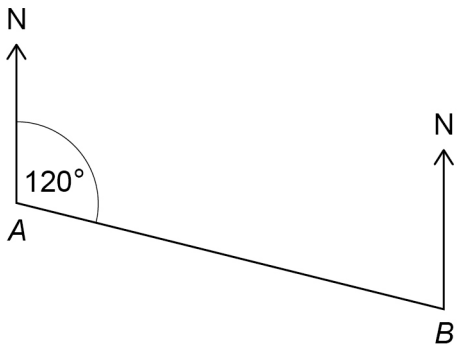
9 m is a multiple of 3

Tick **one** box for each statement.

[4 marks]

	True	May be true	Not true
$2m$ is even	☐	☐	☐
$3m$ is even	☐	☐	☐
$4m$ is a multiple of 6	☐	☐	☐
$5m$ is a multiple of 7	☐	☐	☐

10



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Work out the bearing of *A* from *B*.

[2 marks]

Answer _____ °

Do not write outside the box

11 (a) Circle the number that is written in standard form.

[1 mark]

0.8×10^5 6×10^9 14×10^3 $2.5 \times 10^{0.5}$

11 (b) Write 2^{-4} as a number in standard form.

[2 marks]

Answer _____

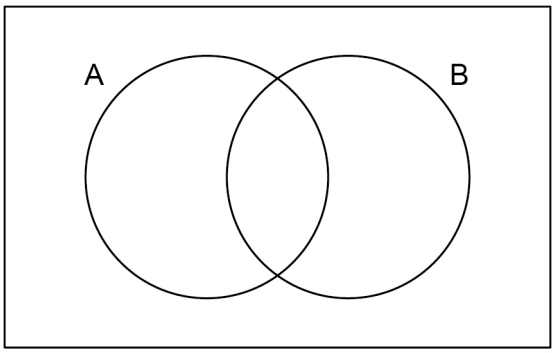
Turn over for the next question

9

Do not write outside the box

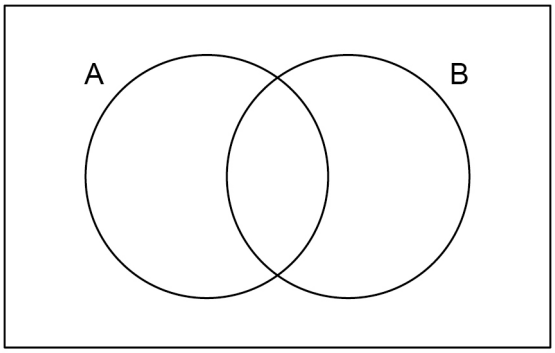
12 (a) On the Venn diagram, shade the region that represents $A \cup B$

[1 mark]



12 (b) On this Venn diagram, shade the region that represents B'

[1 mark]



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13 An arithmetic progression has

1st term = 13

9th term = 125

Work out the nth term of the arithmetic progression.

[3 marks]

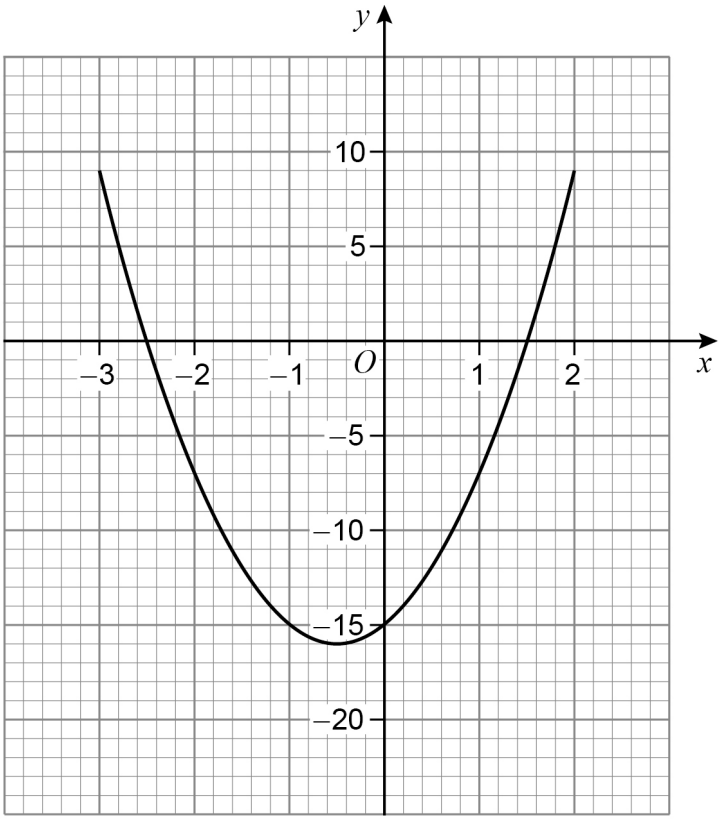
Answer _____

Turn over for the next question

5

Do not write outside the box

14 Here is the graph of $y = 4x^2 + 4x - 15$ for values of x from -3 to 2



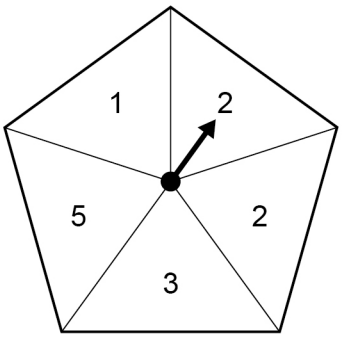
Use the graph to estimate the **two** solutions to $4x^2 + 4x - 15 = -8$

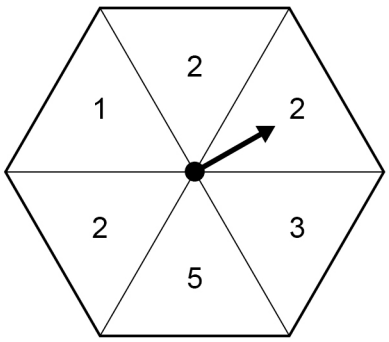
[2 marks]

$x =$ _____ $x =$ _____

Do not write outside the box

15 Here are two fair spinners.





Each spinner is spun once.

Work out the probability of getting an odd number on **both** spinners.

[3 marks]

Answer _____

Turn over for the next question

5

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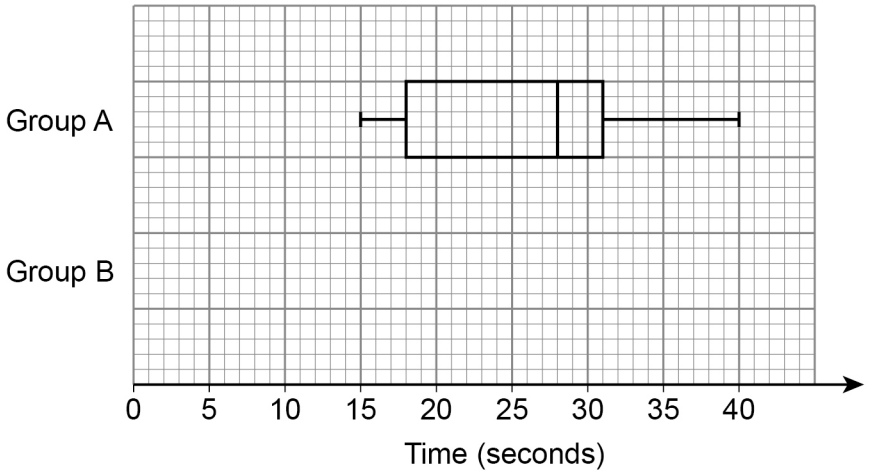
16 Two groups of people, A and B, solved a puzzle.

The box plot represents the times taken by group A.



Here is some information about the times taken by group B.

	Time (seconds)
Fastest	12
Lower quartile	21
Median	30
Upper quartile	32
Range	same as group A

16 (a) On the grid, draw a box plot to represent the times taken by group B.

[3 marks]

Do not write outside the box

16 (b) Which group had the more consistent times?

Tick a box.

Group A ☐ Group B ☐

Show calculations to support your answer.

[3 marks]

17 An animal sanctuary has 30 adult lions and some young lions.

40% of **all** the lions are adults.

$\frac{4}{9}$ of the young lions are male.

Work out the number of young male lions.

[3 marks]

Answer _____

9

Do not write outside the box

18 (a) When x is increased by 20% the answer is y.

Work out the ratio $x : y$

[1 mark]

Answer _____ : _____

18 (b) Discs in a bag are red, blue or green.

The numbers are in the ratio

red : blue : green = 4 : 7 : 2

There are 120 **more** blue discs than green discs.

Work out the number of red discs.

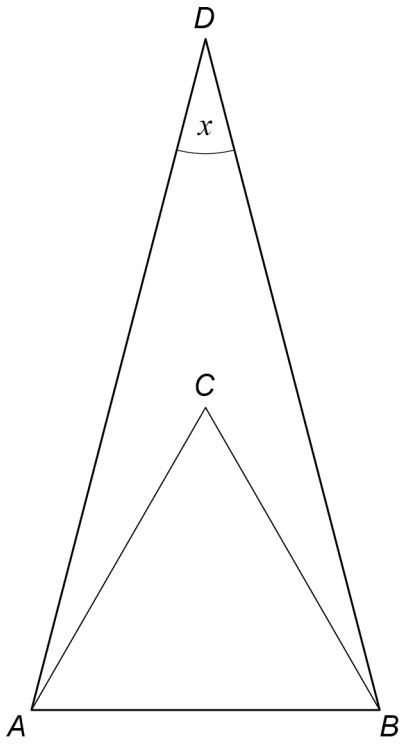
[3 marks]

Answer _____

Do not write outside the box

19 *ABC* is an equilateral triangle.

ABD is an isosceles triangle with $AD = BD$



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Show that angle $DAC = 30° - \frac{x}{2}$

[3 marks]

7

Turn over ►

Do not write outside the box

20 $f(x) = \frac{1}{x} + 3$

20 (a) Work out the value of 8f(2)

[2 marks]

Answer _____

20 (b) $g(x) = x^2$

Write down an expression for fg(x)

[1 mark]

Answer _____

Do not write outside the box

21 Rearrange $w = \dfrac{xy}{x+y}$ to make y the subject.

[4 marks]

Answer _____

Turn over for the next question

7

Do not write outside the box

22 (a) Show that $\sqrt{45} + \sqrt{80}$ can be written as $a\sqrt{5}$ where a is an integer.

You **must** show your working.

[3 marks]

22 (b) Rationalise the denominator of $\dfrac{46}{5+\sqrt{2}}$

Give your answer in the form $a - b\sqrt{2}$ where a and b are integers.

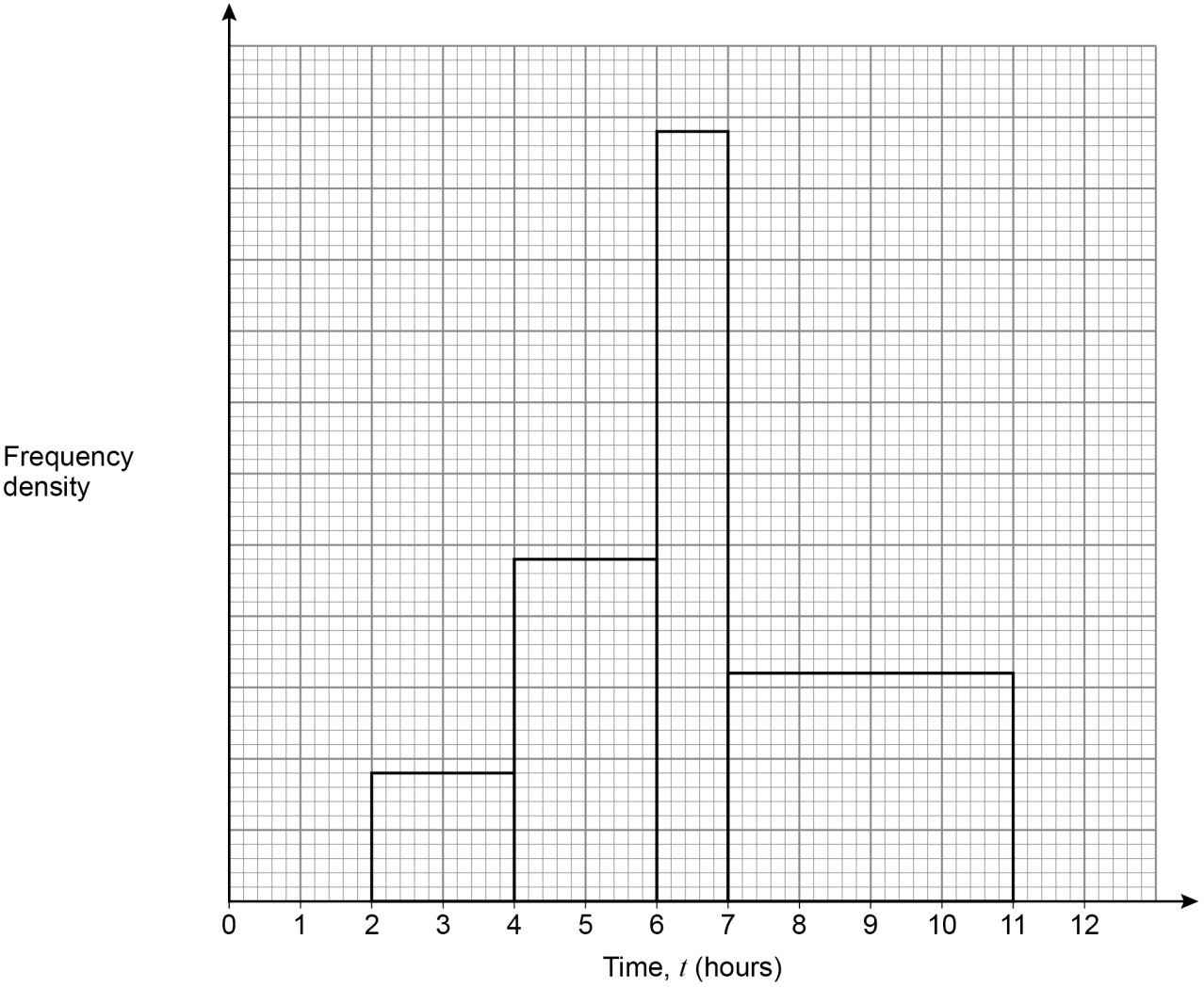
You **must** show your working.

[3 marks]

Answer _____

Do not write outside the box

23 The histogram shows information about the time some people spent working one day.



Use the histogram to complete the grouped frequency table.

[3 marks]

Time, t (hours)	**Frequency**
$2 < t \leqslant 4$	
$4 < t \leqslant 6$	24
$6 < t \leqslant 7$	
$7 < t \leqslant 11$	

9

Turn over ►

Do not write outside the box

24 Simplify fully $(x-5)^3 + 3x(2x-25)$

[4 marks]

Answer _____

Do not write outside the box

25 d is **inversely** proportional to e^2

$d = 6.4$ when $e = 2.5$

Work out the value of d when $e = 20$

[4 marks]

$d =$ _____

Turn over for the next question

8

Do not write outside the box

26 A curve has equation $y = x^4 - 32x$

Work out the x-coordinate of the stationary point.

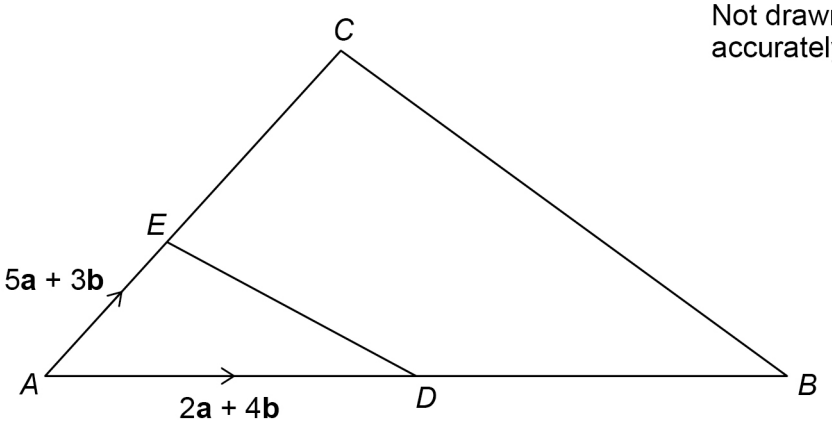
[3 marks]

$x =$ _____

Do not write outside the box

27 *ABC* is a triangle.

$\overrightarrow{AD} = 2\mathbf{a} + 4\mathbf{b}$ $\overrightarrow{AE} = 5\mathbf{a} + 3\mathbf{b}$



27 (a) Show that $\overrightarrow{DE} = 3\mathbf{a} - \mathbf{b}$

[1 mark]

27 (b) *D* is the midpoint of *AB*.

$\overrightarrow{AE} = \frac{1}{3}\overrightarrow{AC}$

Work out $\overrightarrow{BC}$ in terms of **a** and **b**.

Give your answer in its simplest form.

[3 marks]

Answer _____

7

Turn over ►

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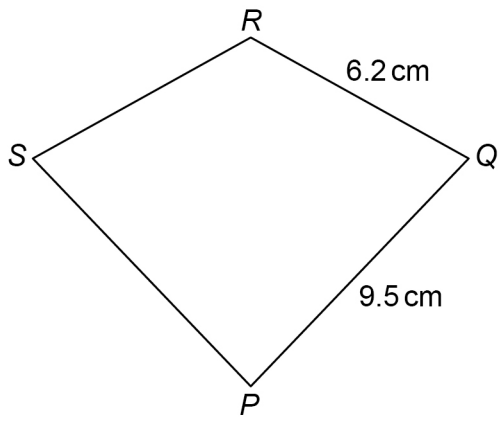
28 Here is a kite.



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The area of the kite is 50 cm^2

Angle *PQR* is acute.

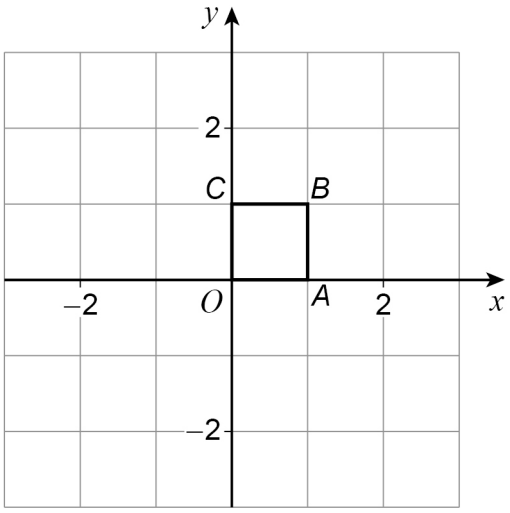
Work out length *PR*.

[5 marks]

Answer _____ cm

Do not write outside the box

29 Here is the unit square $OABC$.



The unit square is transformed by two matrices, **S** and **T**.

S represents a reflection in the y-axis.

$$\mathbf{T} = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$$

Complete the statements.

[3 marks]

A geometric description of the single transformation **ST** is _____

_____

_____

The matrix that represents the single transformation **ST** = $\begin{pmatrix} & \\ & \end{pmatrix}$

8

Do not write outside the box

30 Solids A and B are similar.

A has volume 2400 cm^3

B has volume 8100 cm^3

The surface area of A is 1840 cm^2

Work out the surface area of B.

[3 marks]

Answer _____ cm^2

END OF QUESTIONS

3

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ANSWER IN THE SPACES PROVIDED

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