

Please write clearly in block capitals.

Centre number

Candidate number

Surname

Forename(s)

Candidate signature

I declare this is my own work.

INTERNATIONAL GCSE

MATHEMATICS

Extension Tier Paper 1E

E

Wednesday 5 November 2025

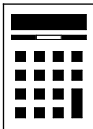
07:00 UK Time

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	
28–29	
TOTAL	

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

- 1** Write 180 as a product of prime factors.
Give your answer in index form.

[3 marks]

Answer _____

- 2** Multiply out and simplify fully $5(3x + 4y) - 2(x + 3y)$

[2 marks]

Answer _____



- 3 Work out the reciprocal of $2\frac{5}{7}$
Give your answer as a fraction.

[2 marks]

Answer _____

- 4 At a school each student studies French, Spanish or German.
Here is some information about the students in two classes.

	Study French	Study Spanish	Study German
Class A	7	13	10
Class B	15	19	16

Which class has a **greater** proportion of students who study French?

Tick a box.

☐

Class A

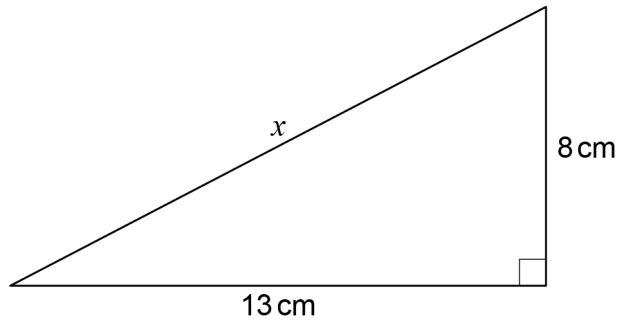
☐

Class B

Show working to support your answer.

[2 marks]

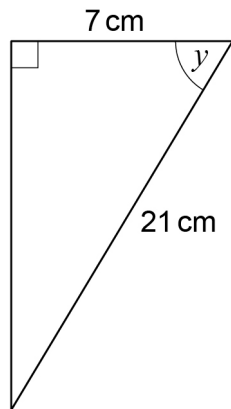


5 (a)Not drawn
accuratelyUse Pythagoras' theorem to work out the value of x .

Give your answer as a decimal.

[3 marks]

 $x =$ _____ cm

5 (b)Not drawn
accuratelyUse trigonometry to work out the size of angle y .**[3 marks]**

 $y =$ _____ °**Turn over for the next question****Turn over ►**

6

Match each equation to a description of its graph.

One has been done for you.

[3 marks]

	A horizontal line
$y = -1$	A curve that is always above the x -axis
$y = x^3$	A straight line with a gradient of 2
$y = 2x + 1$	A straight line passing through (0, 2)
$y = x^2 + 1$	A curve passing through the origin
	A vertical line

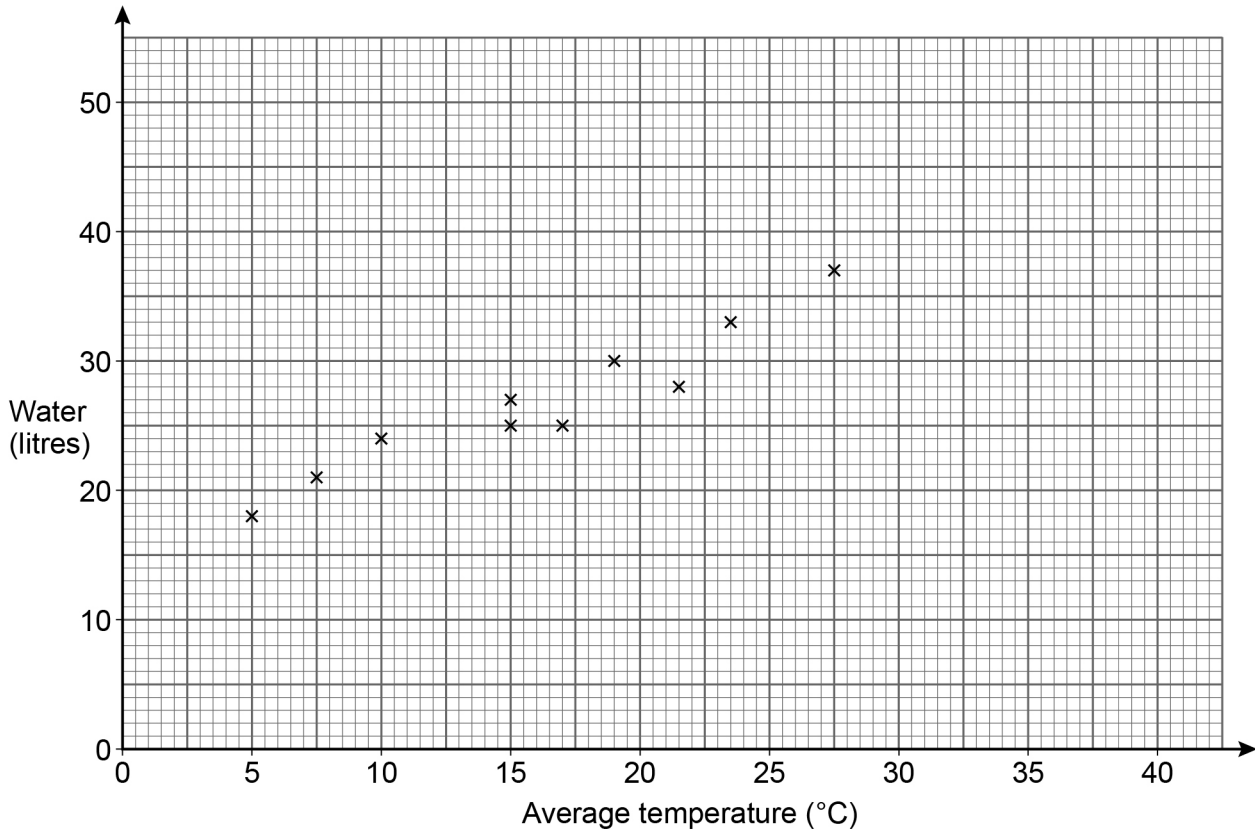


7

On ten days, a farmer records

- the amount of water, in litres, a donkey drinks
- the average temperature, in $^{\circ}\text{C}$

The scatter graph shows the results.



- 7 (a) Draw a line of best fit and use it to estimate the amount of water the donkey drinks when the average temperature is 12.5°C

[2 marks]

Answer _____ litres

- 7 (b) On another day the average temperature is 40°C

Why is it **not** sensible to use the line of best fit to estimate the amount of water the donkey drinks on this day?

[1 mark]



- 8 (a)** Work out $(2.1 \times 10^{10}) \div (5 \times 10^4)$
Give your answer in standard form.

[2 marks]

Answer _____

- 8 (b)** Write these numbers in order, starting with the **smallest**.

[2 marks]

2.7×10^{-5}

3.5×10^3

8.3×10^{-4}

9.6×10^{-5}

Answer _____



9

An isosceles triangle has a base of length b cm

The two other sides are each 5 cm shorter than 3 times the length of the base.

Work out an expression, in terms of b , for the **perimeter** of the isosceles triangle.

Give your answer in its simplest form.

[3 marks]

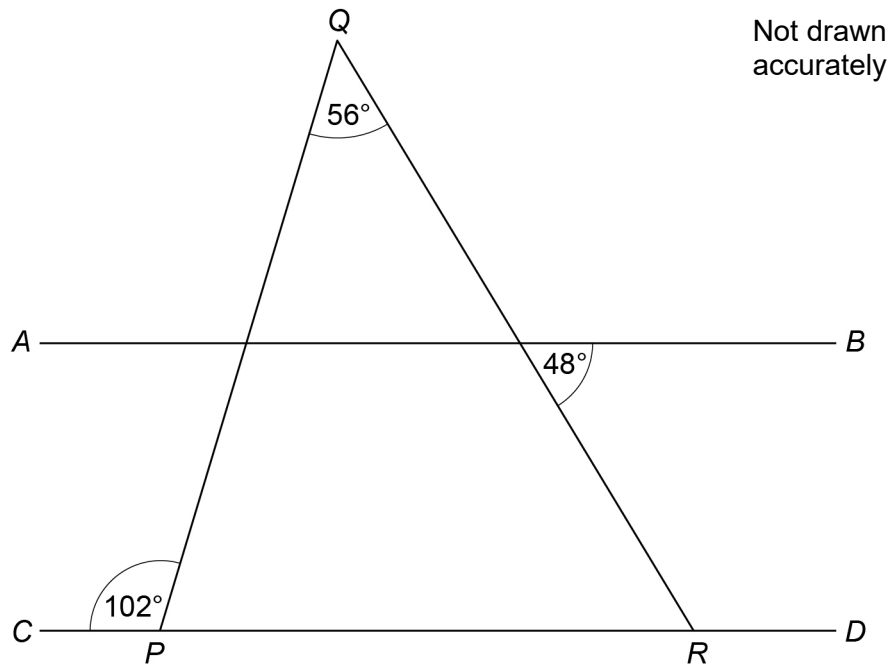
Answer _____ cm

Turn over for the next question



10

AB , CD , PQ and QR are straight lines.



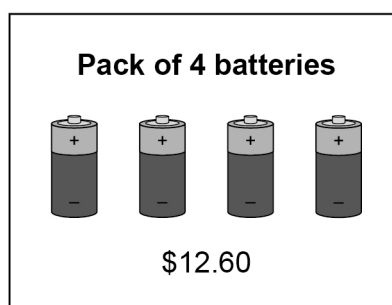
Is AB parallel to CD ?

Show working to support your answer.

[3 marks]



A shop sells batteries in two different pack sizes.



Both packs now give the **same** value for money.

Work out the percentage decrease in the price.

[4 marks]

[illegible]

Answer	%
1	100



12

Solve the simultaneous equations.

$$5x - 6y = 34$$

$$3x + 4y = 9$$

You **must** show your working.**[4 marks]**

 $x = \underline{\hspace{2cm}} \quad y = \underline{\hspace{2cm}}$ 

- 13** Information about the heights of some plants is shown in the cumulative frequency table.

Height, h (cm)	Cumulative frequency
$0 < h \leq 10$	8
$0 < h \leq 20$	12
$0 < h \leq 30$	23
$0 < h \leq 40$	31
$0 < h \leq 50$	40
$0 < h \leq 60$	65

- 13 (a)** How many **more** plants are in the class interval $20 < h \leq 30$ than in $10 < h \leq 20$?
[2 marks]

Answer _____

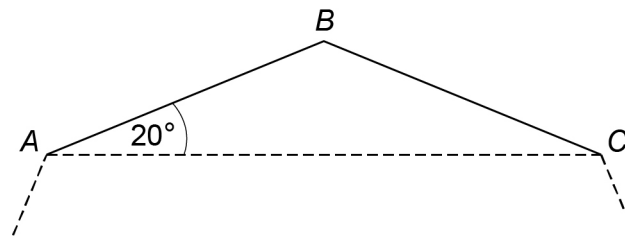
- 13 (b)** One of the plants is chosen at random.
Work out the probability that the height of the plant is **greater** than 30 cm

[2 marks]

Answer _____



- 14** AB and BC are sides of a regular polygon.



Not drawn
accurately

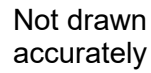
Angle $BAC = 20^\circ$

Work out the number of sides of the regular polygon.

[3 marks]

Answer _____

A , B and C are three points on a straight line.



Show that point B is the midpoint of AC .

[illegible]

16

Pavel writes,

$$4^{\frac{1}{2}} = 2 \quad \text{and} \quad \frac{1}{2} \times 4 = 2 \quad \text{so} \quad a^{\frac{1}{2}} = \frac{1}{2} \times a$$

Is Pavel correct?

Tick a box.

☐

Yes

☐

No

Give a reason for your answer.

[1 mark]

17

The base of a pyramid has n sides.In terms of n , how many **more** edges than faces does the pyramid have?

Give your answer in its simplest form.

[2 marks]

Answer _____



- 18 Write $\frac{5}{a^2} - \frac{3}{7a}$ as a single fraction in its simplest form.

[2 marks]

Answer _____

- 19 Work out the roots of the equation $(4x - 3)(1 + x) = 0$

[2 marks]

$x =$ _____ and $x =$ _____

Turn over for the next question

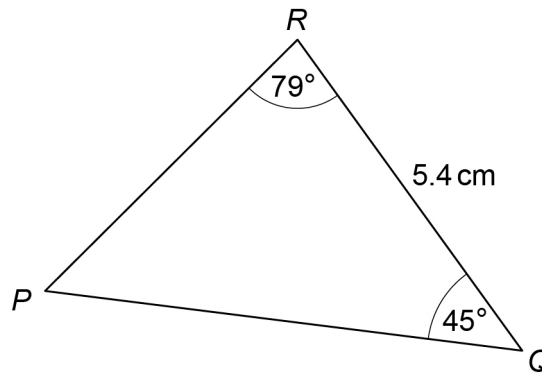


- 20 Rearrange $y = \frac{x}{1-3x}$ to make x the subject.

[3 marks]

Answer _____

- 21 Here is triangle PQR .

Not drawn
accuratelyWork out the length PQ .

[3 marks]

Answer _____ cm



Lucy invests \$2000 into an account.

- Work out the minimum possible value of x .

Give your answer as a whole number of dollars.

[5 marks]

[illegible]

Answer

Turn over for the next question



23

$$2b : 3c = 4 : 5$$

Work out the ratio $b : c$

Give your answer in its simplest form, where b and c are integers.

[3 marks]

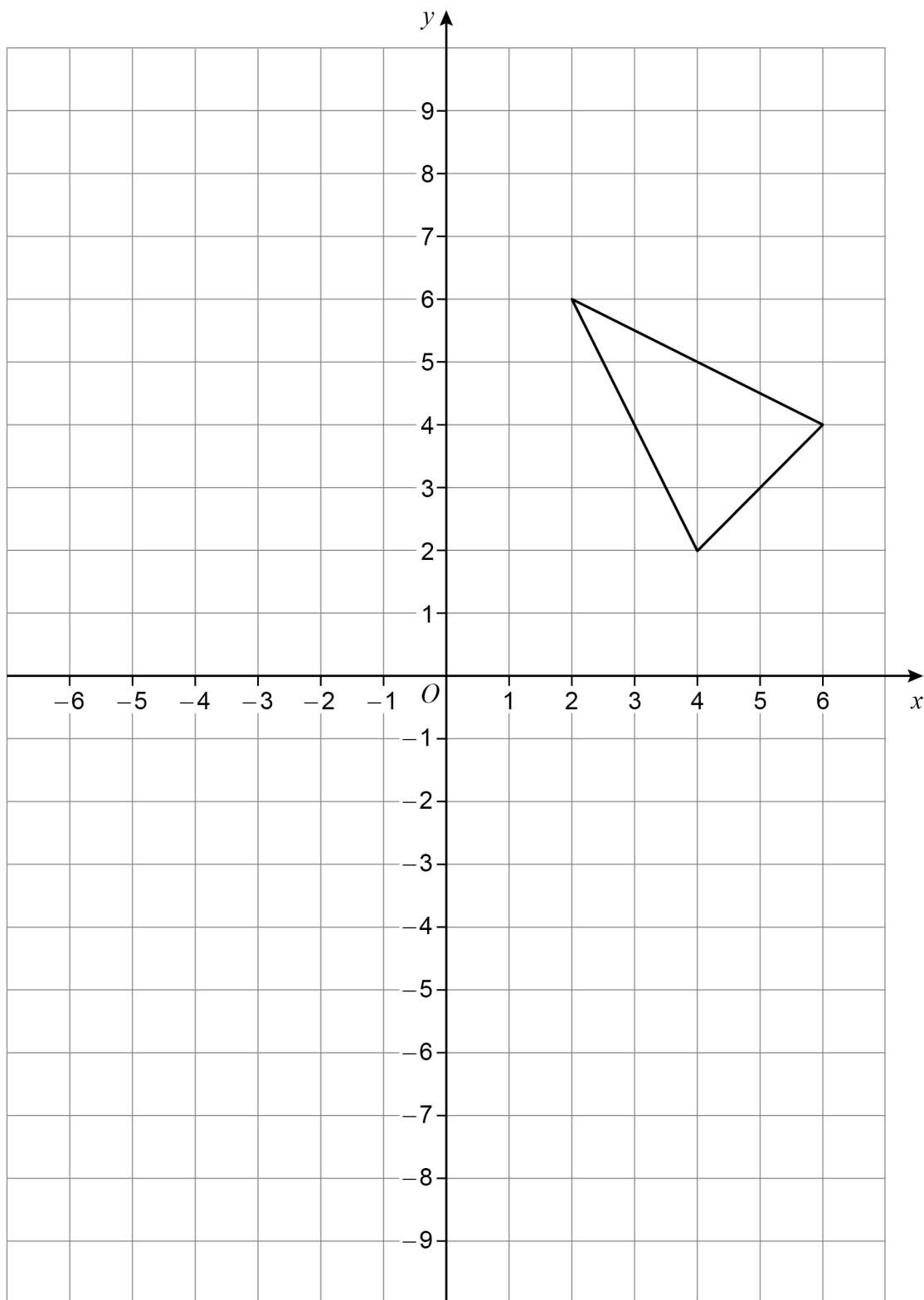
Answer _____ :



24

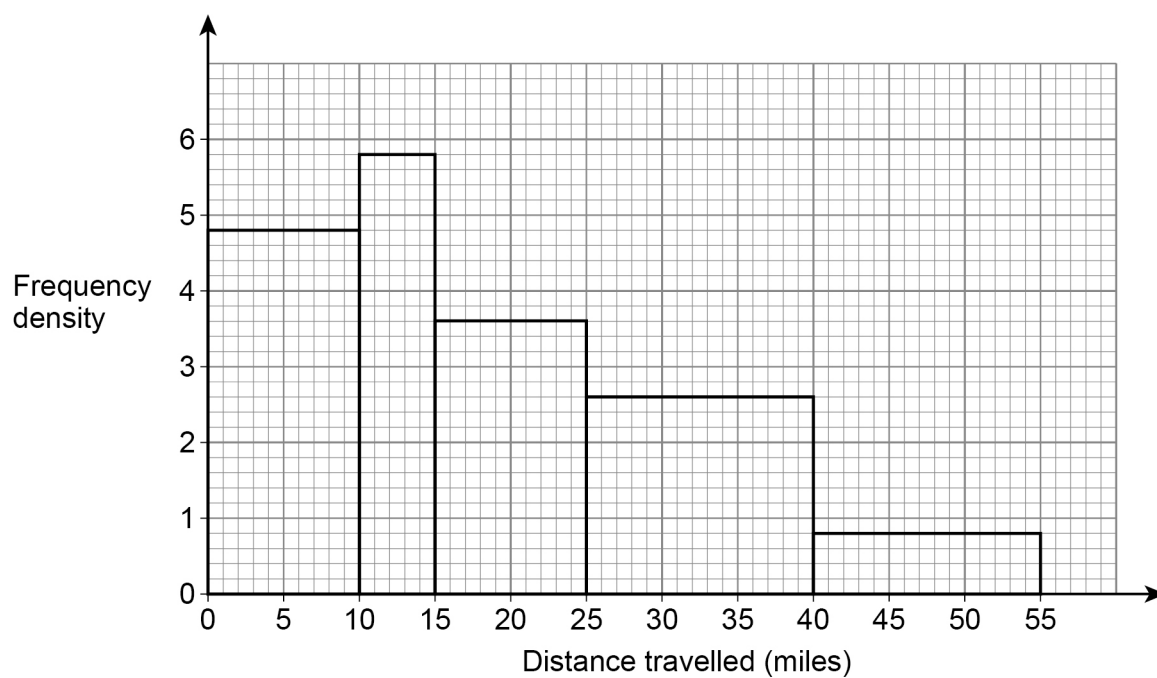
Enlarge the triangle by scale factor $-\frac{1}{2}$, centre O .

[2 marks]



25

Faduma asks some people about the distance they travel to work each day.
The histogram represents the results.



Estimate the number of people who travel **less than** 20 miles to work each day.

[3 marks]

Answer _____



Points P and Q lie on the curve with equation $y = 2x^2 - 9x + 7$

The x -coordinate of P is 5

Work out the x -coordinate of Q.

[5 marks]

[illegible]
$$x =$$

8

Turn over ►



27

A plane travels 905 km, correct to the nearest km

The plane travels for 4 hours 15 minutes, correct to the nearest 5 minutes.

Work out the **lower bound** for the average speed of the plane.

Give your answer in km/h

You **must** show your working.

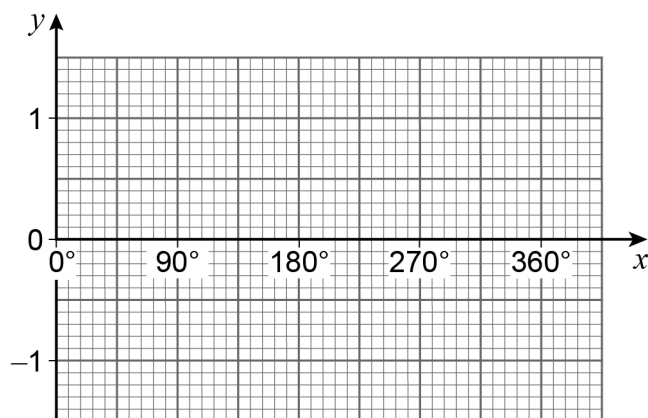
[3 marks]

Answer _____ km/h

28

On the grid, draw the graph of $y = \sin x$ for values of x from 0° to 360°

[2 marks]

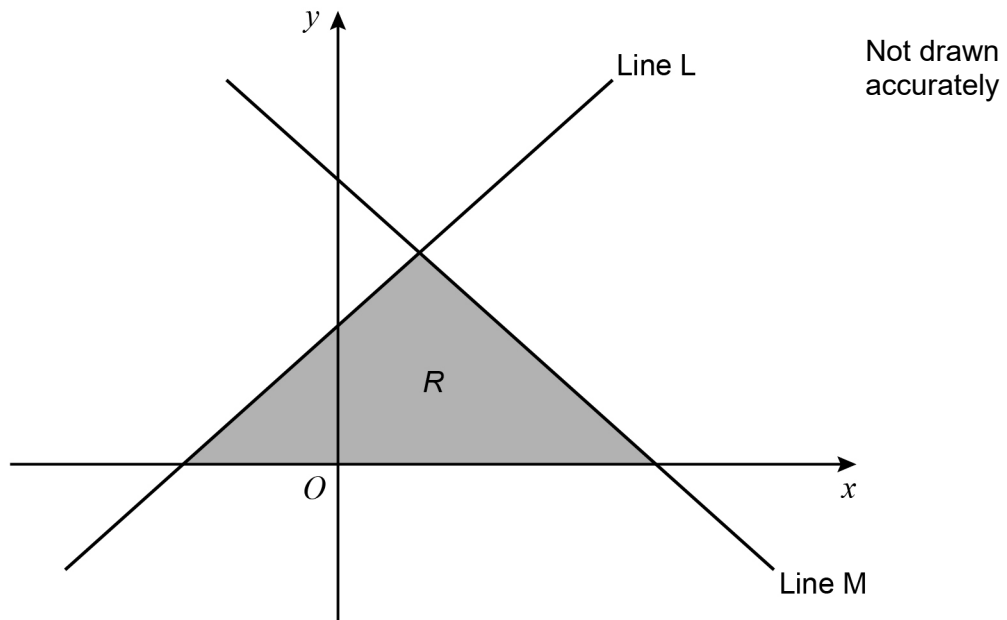


30

Line L has equation $y = \frac{3}{4}x + 5$

Line L and line M

- are perpendicular
- intersect at a point with x -coordinate 4



The region R , shown shaded on the diagram, can be identified by three inequalities.

Work out the inequalities.

[5 marks]

Answer _____

Turn over for the next question



31

$$\mathbf{A} = \begin{pmatrix} 1 & 2^n \\ -2 & 0 \end{pmatrix} \quad \mathbf{B} = \begin{pmatrix} 2^n & 0 \\ 1 & 6 \end{pmatrix} \quad \text{where } n \text{ is a constant.}$$

Show that $\mathbf{AB}$ can be written in the form $\begin{pmatrix} 2^{n+1} & r(2^{n+1}) \\ s(2^{n+1}) & 0 \end{pmatrix}$

where r and s are integers.

[4 marks]

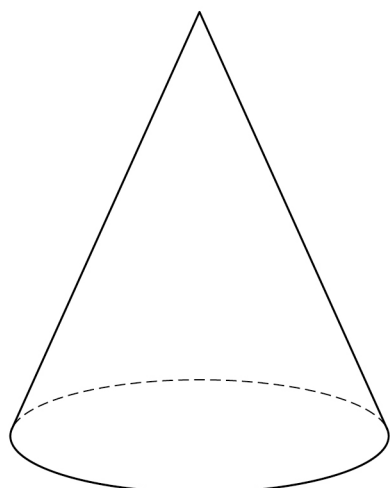


32

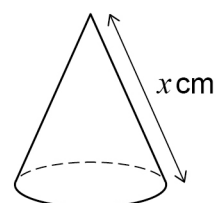
A small cone is cut off parallel to the base of a large cone to make a frustum.

The small cone has a slant height of x cm

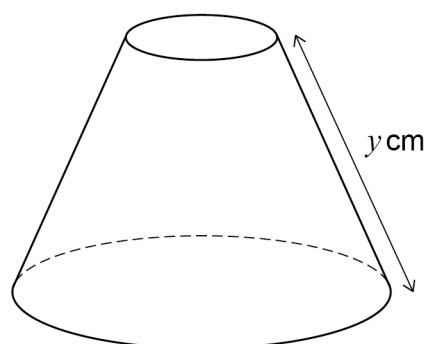
The frustum has a slant height of y cm



Large cone



Small cone



Frustum

Volume of small cone : volume of frustum = 64 : 665

Work out $x : y$

[2 marks]

Answer _____ :

END OF QUESTIONS



There are no questions printed on this page

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outside the
box*

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ANSWER IN THE SPACES PROVIDED**



[illegible]

Turn over ►



[illegible]