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MATHEMATICS **0580/33**

Paper 3 (Core) **October/November 2024**

2 hours

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 104.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages.

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[Turn over

1 **(a)** **(i)** Li has $20.
A box of cereal costs $2.29 .

Work out the maximum number of boxes of cereal that Li can buy.

..... [2]

(ii) Each box of cereal has mass 615 g.

Work out the total mass of 5 boxes of cereal.
Give your answer in kilograms.

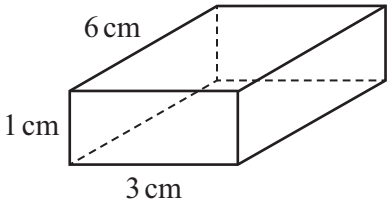
..... kg [2]

(iii) The box of cereal is a cuboid.
The cuboid measures 25 cm by 20 cm by 5 cm.

Work out the volume of the cuboid.

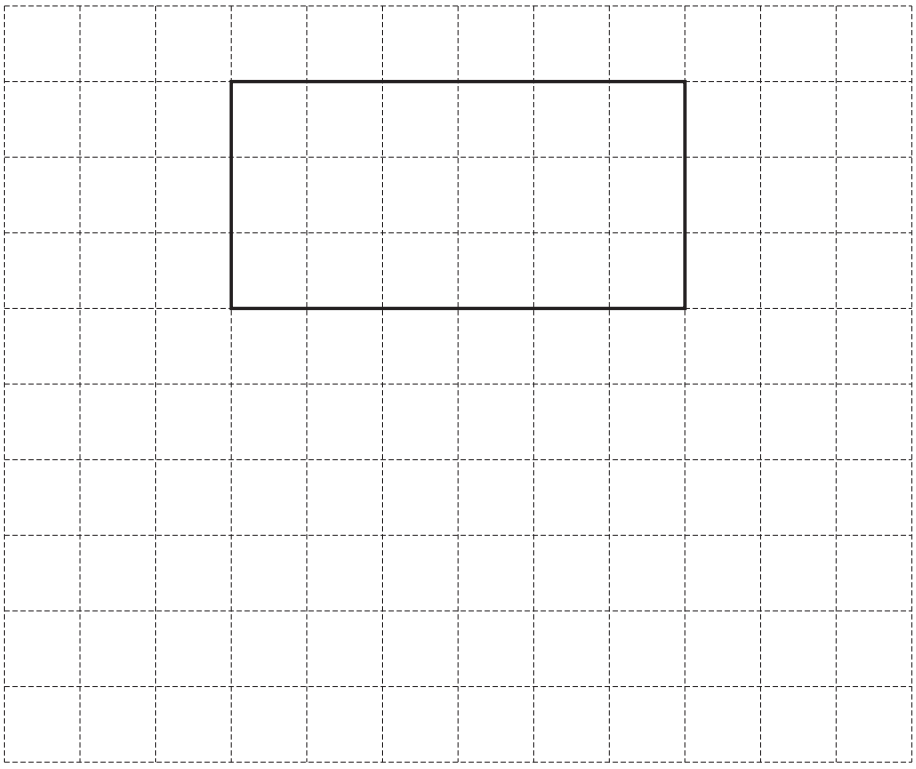
..... cm^3 [1]

(b) A cereal bar is in a box.
The box is a cuboid measuring 6 cm by 3 cm by 1 cm.



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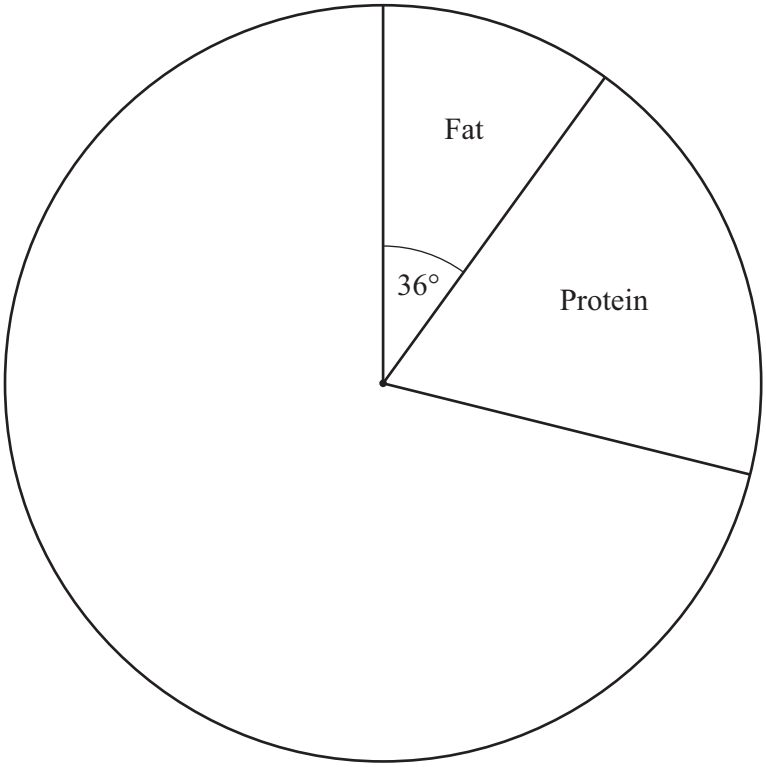
On the 1 cm^2 grid, complete a net of the cuboid.
One face has been drawn for you.



[3]

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(c) The cereal contains fat, protein, carbohydrate and fibre.
The pie chart shows the information about the masses of fat and protein.



(i) Work out the percentage of the mass of the cereal that is fat.

..... % [1]

(ii) 60% of the mass of the cereal is carbohydrate.

Complete the pie chart.

[2]

(iii) Work out the mass of protein in 30 g of the cereal.

..... g [2]

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2 **(a)** Write the number 845 024 in words.

..... [1]

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

$\frac{7}{18}$ 39% $\frac{15}{40}$ 0.388

..... < ..... < ..... < ..... [2]
smallest

(c) Find the value of

(i) 4^5

..... [1]

(ii) 6^0

..... [1]

(iii) $\sqrt{16} \times \sqrt{49}$.

..... [1]

(d) Solve.

$6x + 5 = 29$

$x =$ ..... [2]

(e) By writing each number in the calculation correct to 1 significant figure, find an estimate for the value of

$$\frac{2.7 \times 42.4}{8.6 - 4.3}.$$

You must show all your working.

..... [2]

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(f) $3^5 \times 3^x = 3^{20}$

Find the value of x.

$x =$ ..... [1]

(g) Simplify $(x^4)^3$.

..... [1]

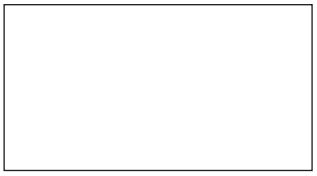
(h) A boat to town A leaves a port every 16 minutes.
A boat to town B leaves the same port every 34 minutes.
Both boats leave the port at 07 30.

Work out the next time both boats leave the port together.

..... [3]

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3 (a)



A wedding invitation is in the shape of a rectangle.

Draw the lines of symmetry on this rectangle. [2]

(b) There are 98 adults and 56 children at the wedding.

Find the fraction of people who are children.
Give your fraction in its simplest form.

..... [2]

(c) The wedding meal starts at 13 15 and lasts for 2 hours 50 minutes.

Find the time the meal ends.

..... [1]

(d) The probability that it will rain at the wedding is 0.12 .

Find the probability that it will not rain.

..... [1]

(e) (i) These are the ages of the staff at the wedding.

16 24 39 28 17 48 31 33 17 29 40 25

Complete the stem-and-leaf diagram.

1	
2	
3	
4	

Key: 1|6 represents 16

[2]

(ii) Find the range.

..... [1]

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4 **(a)** $n = 15r + 20c$

Find the value of r when $n = 180$ and $c = 3$.

$r =$ ..... [2]

(b) Factorise completely.

$20p^2q - 5p$

..... [2]

(c) Apples cost 35 cents each and bananas cost 14 cents each.

Write down an expression for the total cost, in cents, of x apples and y bananas.

..... cents [2]

(d) Solve the simultaneous equations.
You must show all your working.

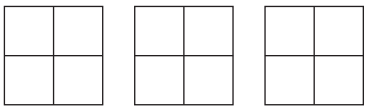
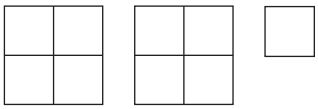
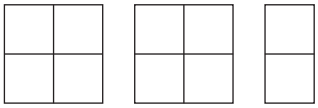
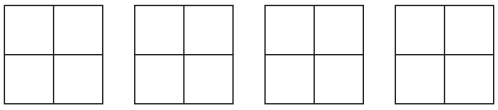
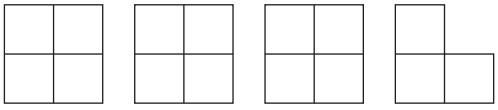
$8x + 3y = 59$
$5x + 7y = 83$

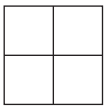
$x =$ .....

$y =$ ..... [4]

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5 **(a)** Kurt owns some toy cars of different colours.
The pictogram shows the number of each colour.

Colour	Number of toy cars
Red	
Yellow	
Green	
Blue	
White	
Other	

Key:  = 8 cars

(i) Write down the colour of toy car that Kurt owns most of.

..... [1]

(ii) Find the number of yellow toy cars that Kurt owns.

..... [1]

(iii) Find how many more red toy cars than white toy cars Kurt owns.

..... [1]

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(b) A toy car costs \$12.40 in the USA and 11.50 euros in Spain.
The exchange rate is 1 euro = \$1.12 .

Calculate the difference in the cost of the toy car in euros.
Give your answer correct to 2 decimal places.

..... euros [3]

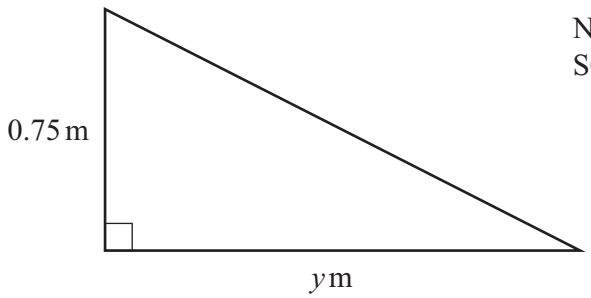
(c) Leo owns some toy vehicles.
He owns 57 cars, 12 bicycles and 42 trucks.

Find the ratio of the number of cars : bicycles : trucks in its simplest form.

..... : ..... : ..... [2]

(d) Leo keeps his toy vehicles on a shelf.

(i) The shelf is in the shape of a right-angled triangle.



The area of the shelf is 0.3 m^2.

Calculate the value of y.

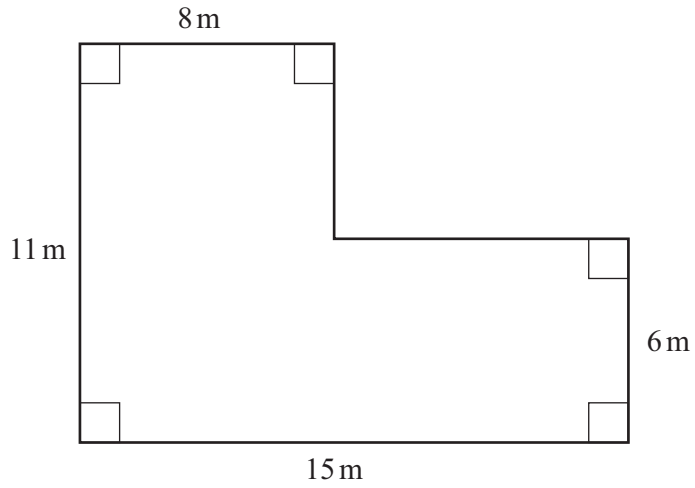
$y =$ ..... [2]

(ii) The shelf is 1.35 metres from the floor.

Change 1.35 metres into centimetres.

..... cm [1]

6 (a)



NOT TO SCALE

The diagram shows a plan of Zak's garden.

Find the perimeter of the garden.

..... m [2]

(b) Zak records the temperature in his garden each night for one week.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
4 °C	1 °C	−2 °C	2 °C	−5 °C	3 °C	−4 °C

(i) Which night was coldest?

..... [1]

(ii) Find the difference in temperature between Friday night and Saturday night.

..... °C [1]

(c) Zak buys pea plants, bean plants and sunflower plants in the ratio peas : beans : sunflowers = 7 : 5 : 2.
He buys 45 bean plants.

Show that the total number of plants he buys is 126.

[2]

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(d) Zak has a water barrel.
On Monday the barrel contains 120 litres of water.
On Friday the barrel contains 43.2 litres of water.

Calculate the percentage decrease of the water in the barrel.

..... % [2]

(e) Zak drives to a shop.

The journey takes $1\frac{1}{4}$ hours.

He drives at an average speed of 57 km/h.

Calculate the distance he drives.

..... km [2]

(f)

Machine hire charges
1st day $22.60
Each additional day $11.80

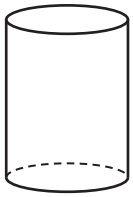
Zak pays $69.80 to hire a machine.

Calculate the number of days he hires it for.

..... days [3]

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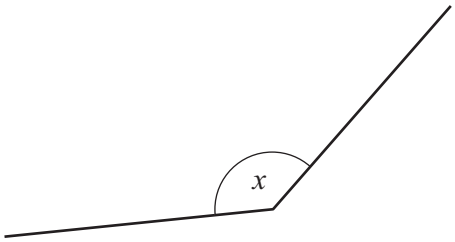
7 (a)



Write down the mathematical name for this solid.

..... [1]

(b)



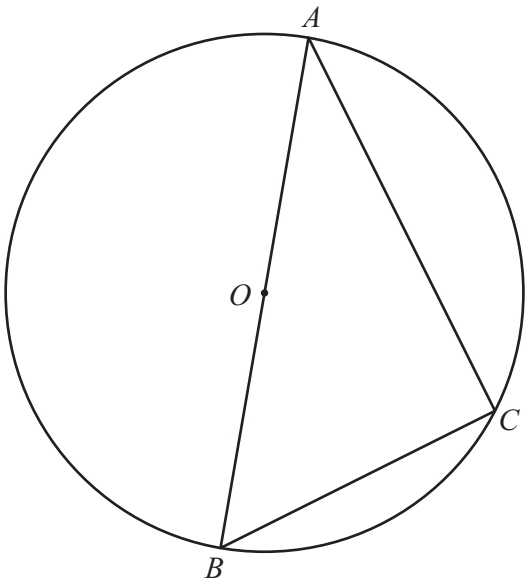
(i) Measure the size of angle x.

..... [1]

(ii) Write down the mathematical name for this type of angle.

..... [1]

(c)



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Points A, B and C lie on the circle, centre O.
$AB = 11\,\text{cm}$ and $BC = 5\,\text{cm}$.

(i) Give a geometrical reason why angle ACB is 90°.

..... [1]

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(ii) Calculate the circumference of the circle.

..... cm [2]

(iii) Show that AC is 9.8 cm, correct to 2 significant figures.

[3]

(d) The surface area of a sphere is 250 cm^2.

Calculate the radius of the sphere.
[The surface area, A, of a sphere with radius r is $A = 4\pi r^2$.]

..... cm [3]

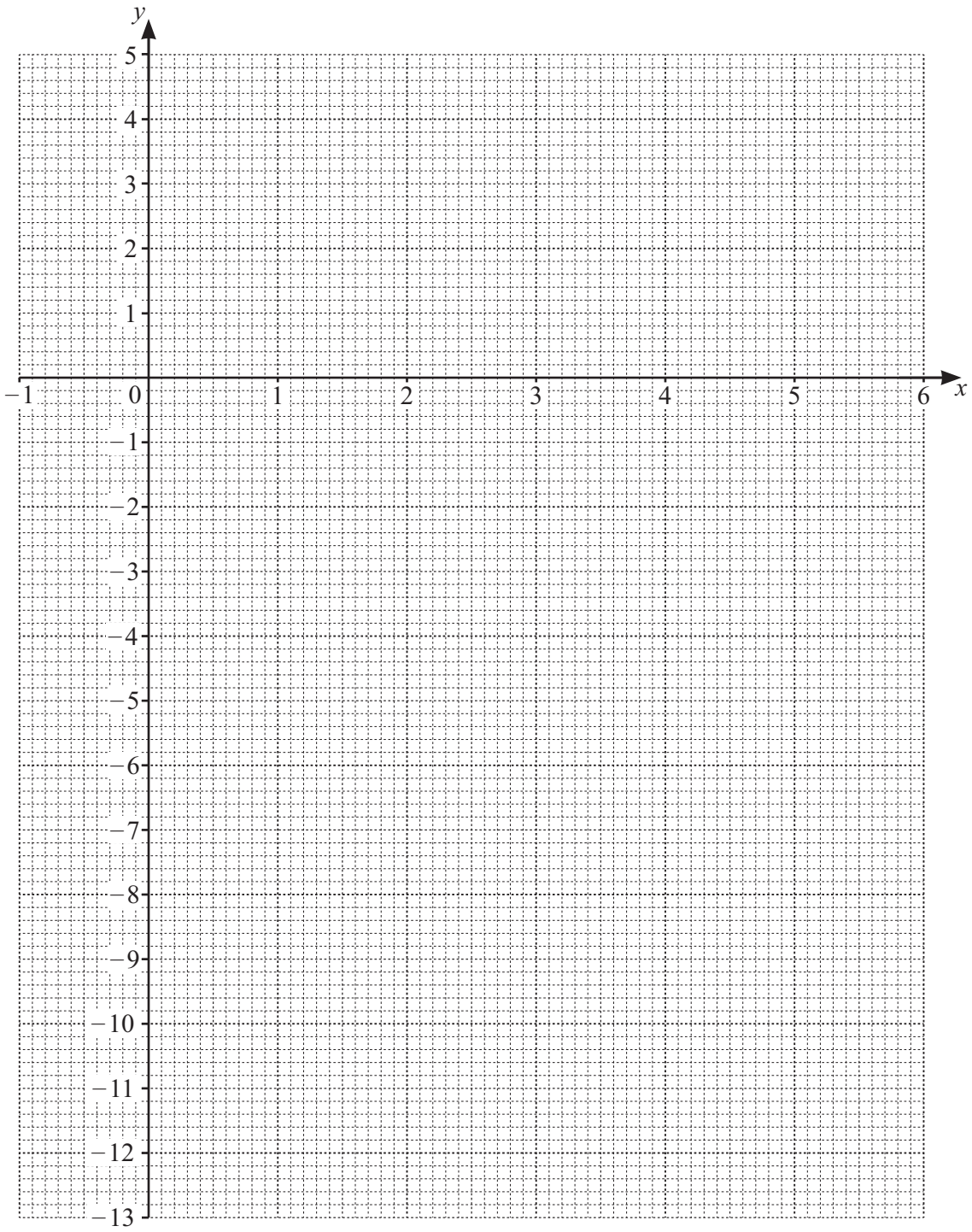
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8 **(a)** **(i)** Complete the table of values for $y = 4x - x^2$.

x	-1	0	1	2	3	4	5	6
y	-5	0	3	4	3		-5	

[2]

(ii) On the grid, draw the graph of $y = 4x - x^2$ for $-1 \leqslant x \leqslant 6$.



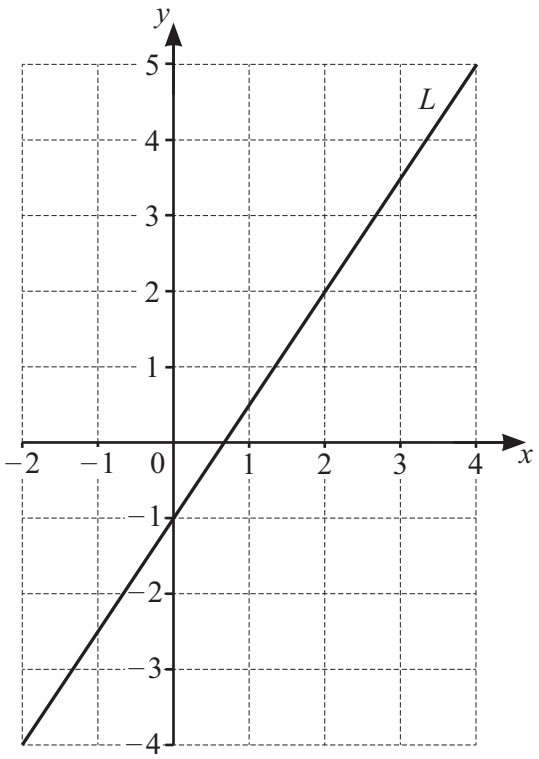
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(iii) Use your graph to solve the equation $4x - x^2 = 1$.

$x =$ ..... or $x =$ ..... [2]

(b) The line L is shown on the grid.



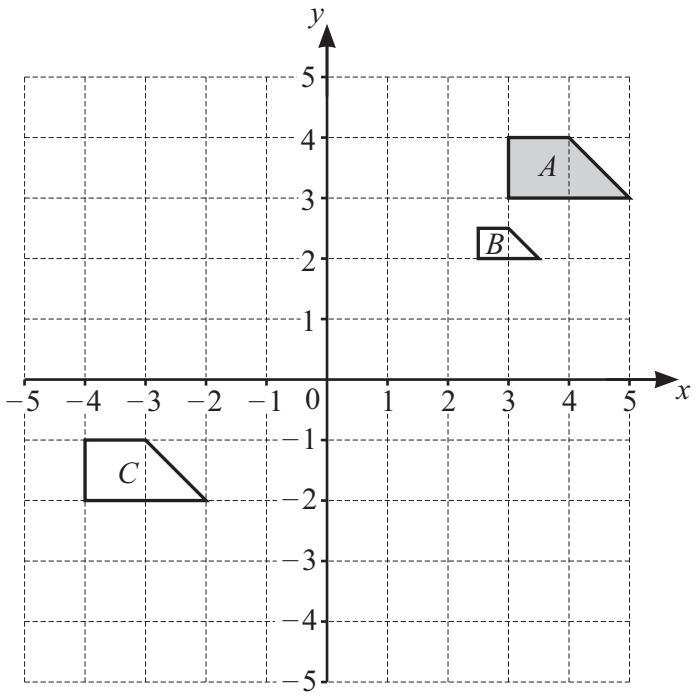
Find the equation of line L.

..... [3]

Question 9 is printed on the next page.

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9 Shapes A, B and C are shown on the grid.



(a) Write down the mathematical name of shape A.

..... [1]

(b) Describe fully the **single** transformation that maps shape A onto shape B.

.....

..... [3]

(c) Describe fully the **single** transformation that maps shape A onto shape C.

.....

..... [2]

(d) Draw the image of shape A after a rotation, 90° clockwise, centre $(0, 0)$. [2]

(e) Draw the image of shape A after a reflection in the line $x = 1$. [2]

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