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0299310220

MATHEMATICS **0580/32**

Paper 3 (Core) **May/June 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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1 **(a)** 6 7 10 12 18 32 49 63

From this list of numbers, write down

(i) a factor of 21

..... [1]

(ii) a square number

..... [1]

(iii) a prime number.

..... [1]

(b) Find the value of

(i) the cube root of 1728

..... [1]

(ii) 2^5

..... [1]

(iii) 5^0

..... [1]

(iv) $36^{\frac{1}{2}}$.

..... [1]

(c) Put one pair of brackets into this calculation to make it correct.

$$3 \times 2 - 6 - 2 \div 2 = 4$$

[1]

(d) Find the lowest common multiple (LCM) of 30 and 68.

..... [2]

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2 **(a)** Simplify.

(i) $5a - 6a + 3a$

..... [1]

(ii) $6x^2 - 6x - 4x^2 - x$

..... [2]

(b) Find the value of $c^2 + d^2$ when $c = 7$ and $d = -5$.

..... [2]

(c) The time, T minutes, to cook a chicken with a mass of m kg is $T = 35m + 20$.

(i) Make m the subject of the formula.

$m =$ ..... [2]

(ii) Find the mass of a chicken that takes 83 minutes to cook.

..... kg [2]

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

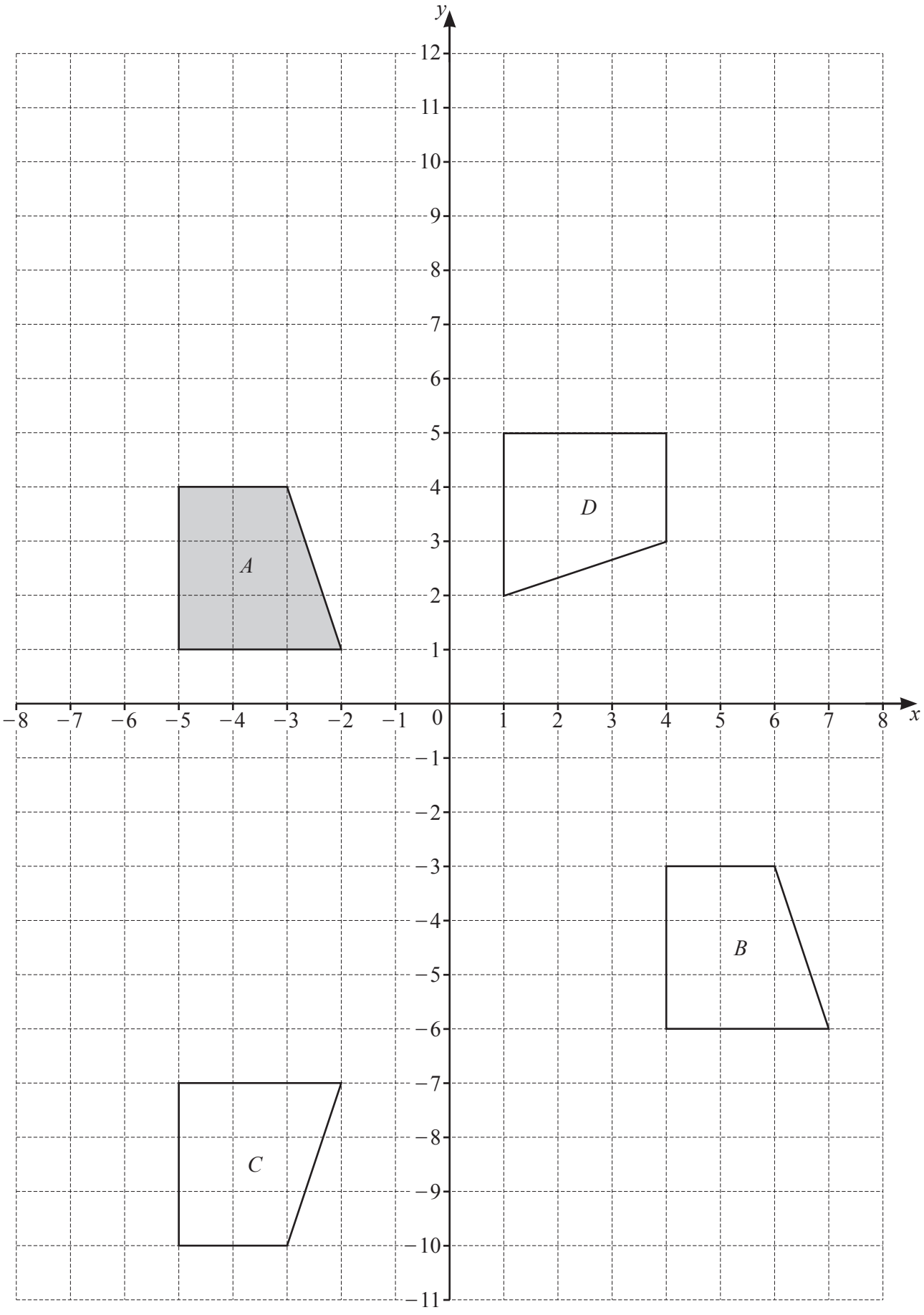
$$5x - 6y = 24$$
$$15x + 8y = 33$$

$x =$ .....

$y =$ ..... [3]

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3 The diagram shows four quadrilaterals, A, B, C and D, on a 1 cm^2 grid.



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

..... [1]

(b) **(i)** Find the area of quadrilateral A.

..... cm^2 [1]

(ii) Measure the perimeter of quadrilateral A.

..... cm [1]

(c) Describe fully the **single** transformation that maps

(i) quadrilateral A onto quadrilateral B

.....

..... [2]

(ii) quadrilateral A onto quadrilateral C

.....

..... [2]

(iii) quadrilateral A onto quadrilateral D.

.....

..... [3]

(d) On the grid, enlarge quadrilateral A by scale factor 2, centre $(-3, -3)$. [2]

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[Turn over

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4 **(a)** Anton records the number of pets owned by each of 50 families.
The table shows some of his results.

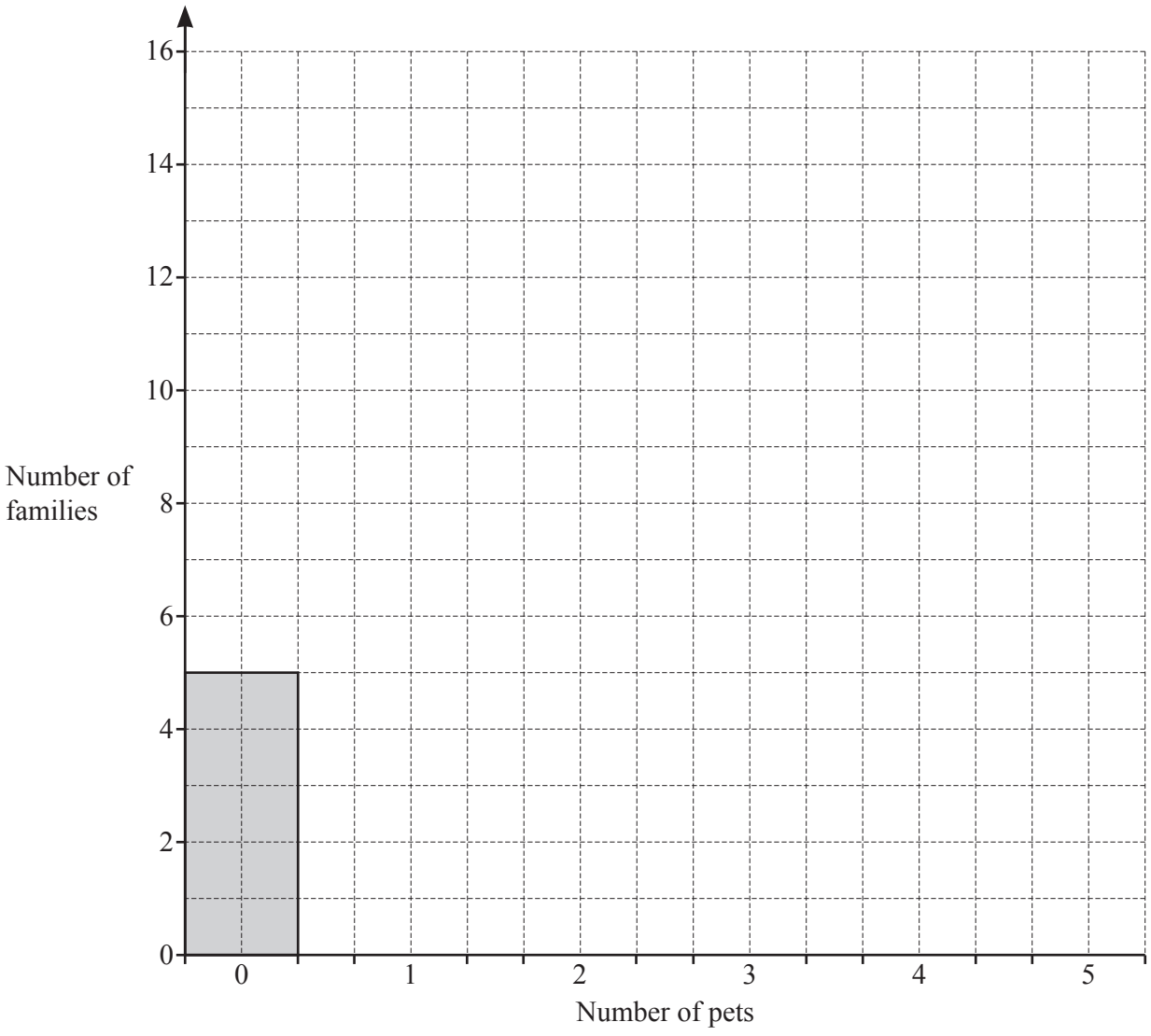
Number of pets	0	1	2	3	4	5
Number of families	5	12	15	9		

There are twice as many families with 4 pets than with 5 pets.

(i) Complete the table.

[3]

(ii) Complete the bar chart.



[2]

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(iii) Write down the mode.

..... [1]

(iv) Calculate the mean.

..... [3]

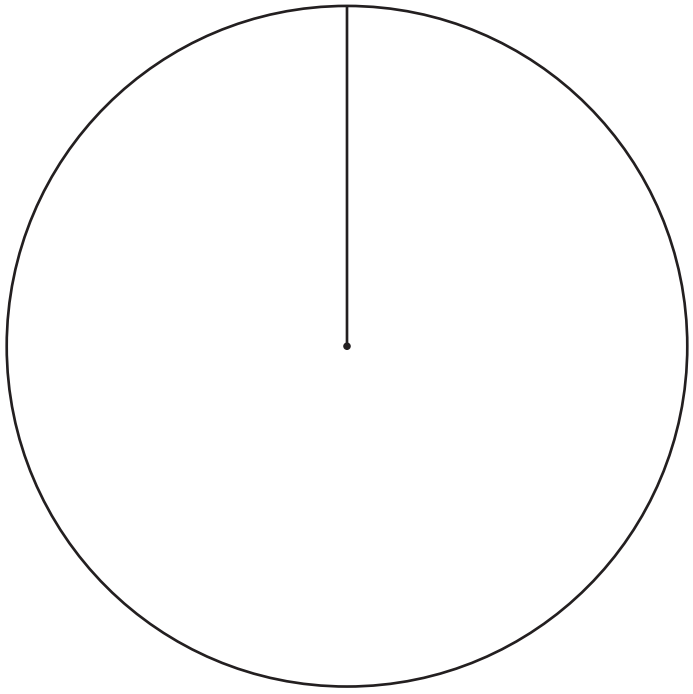
(b) 80 of the pets owned by the families are cats, rabbits or hamsters.
The table shows the number of each pet.

Type of pet	Number of each pet	Pie chart sector angle
Cat	38	
Rabbit	28	
Hamster	14	

(i) Complete the table.

[2]

(ii) Complete the pie chart.



[2]

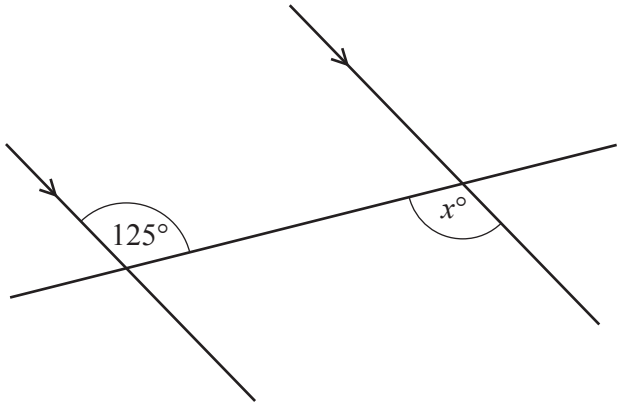
(iii) One of the pets is chosen at random.

Find the probability that a rabbit is chosen.

..... [1]

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5 **(a)**



NOT TO SCALE

The diagram shows a pair of parallel lines and a straight line.

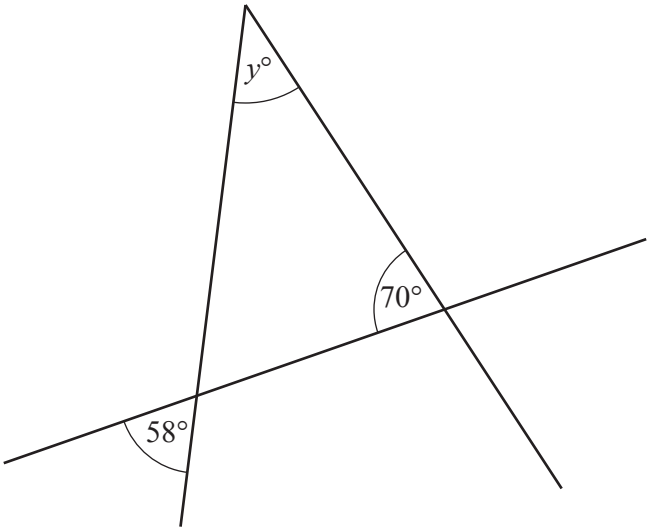
(i) Write down the mathematical name for the type of angle marked 125°.

..... [1]

(ii) Give the geometrical reason why the value of x is 125.

..... [1]

(b)



NOT TO SCALE

The diagram shows three straight lines.

Find the value of y.
Write down the geometrical properties needed to find the value of y.

.....

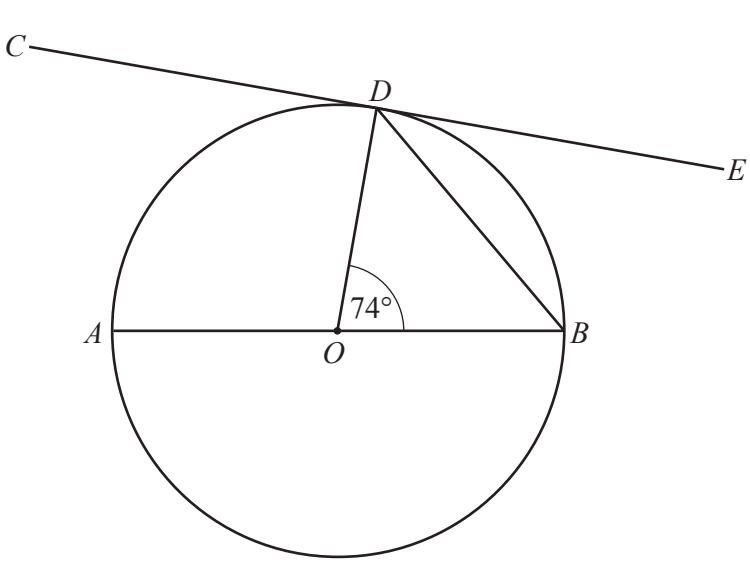
.....

$y =$ ..... [3]

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(c)



The diagram shows a circle, centre O, with diameter AOB.
The line CDE touches the circle at D and angle $DOB = 74°$.

(i) Write down the mathematical name of the line CDE.

..... [1]

(ii) Work out angle ODB.

Angle $ODB =$ ..... [2]

(iii) Work out angle BDE.
Give a geometrical reason for your answer.

Angle $BDE =$ ..... because .....

..... [2]

(d) Find the interior angle of a regular 15-sided polygon.

..... [2]

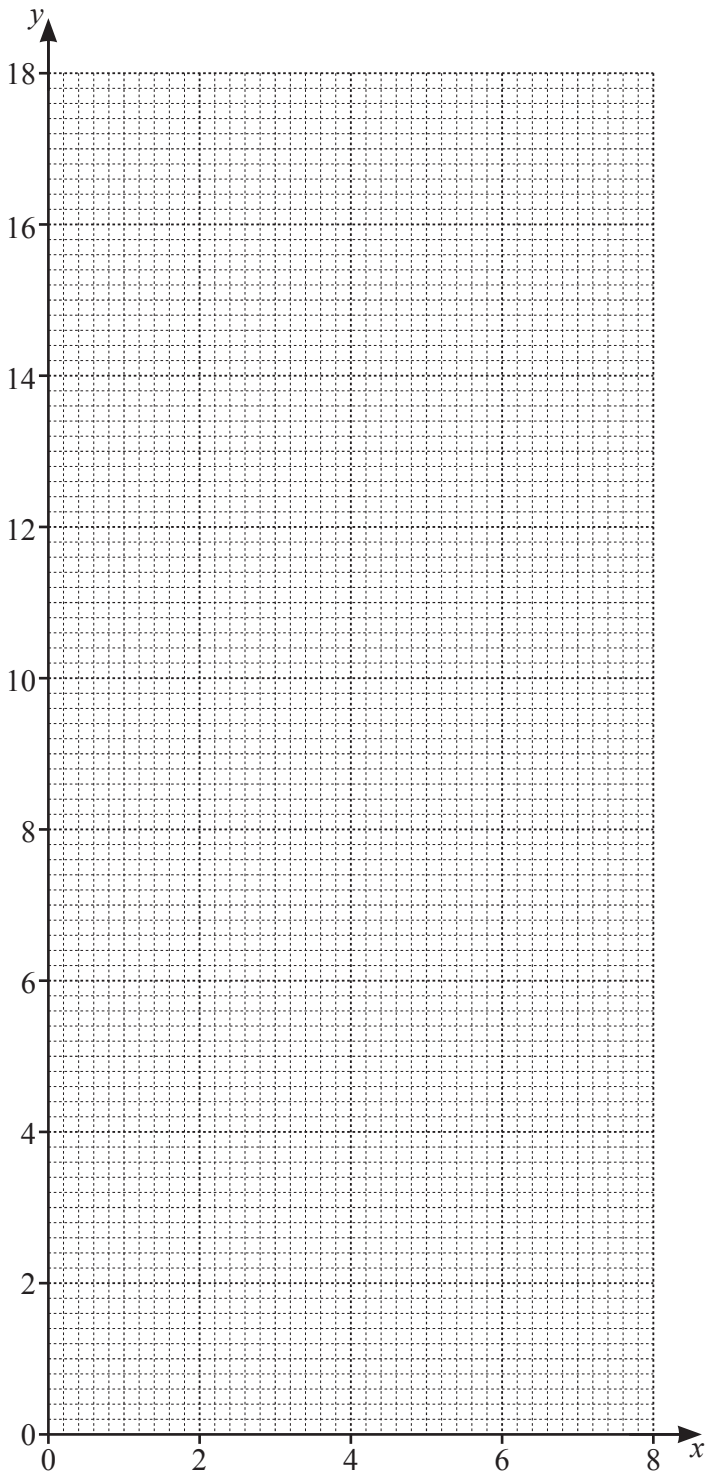
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6 **(a)** **(i)** Complete the table of values for $y = -x^2 + 8x + 1$.

x	0	1	2	3	4	5	6	7	8
y			13		17		13		1

[3]

(ii) On the grid, draw the graph of $y = -x^2 + 8x + 1$ for $0 \leqslant x \leqslant 8$.



[4]

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(iii) Write down the equation of the line of symmetry of the graph.

..... [1]

(b) A straight line has a gradient of $\frac{1}{2}$ and passes through the point (2, 7).

(i) On the grid, draw this line for $0 \leqslant x \leqslant 8$.

[2]

(ii) Write down the equation of this line in the form $y = mx + c$.

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

(iii) Write down the coordinates of the points where this line intersects the graph of $y = -x^2 + 8x + 1$.

(..... , ...) and (..... , ...) [2]

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[Turn over

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7 The area of some land is in the ratio park : gardens : playground = 11 : 2 : 3.
The park has an area of 4620 m^2.

(a) Work out the area of the gardens and the area of the playground.

Gardens ..... m^2

Playground ..... m^2 [3]

(b) The park area of 4620 m^2 is made up of paths and grassland.
18% of the park area is paths.

(i) Show that the grassland area is 3788.4 m^2.

[1]

(ii) Seed for the grassland is sold in bags.
The seed in one bag covers an area of 280 m^2.
The bags cost \$72 each for the first 5 bags and then \$58 each for any extra bags.

Calculate the cost of the seed needed to cover the grassland.

\$ ..... [4]

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(c) The owners of the land buy new equipment for the playground.
They borrow \$8500 for 4 years at a rate of 6.5% per year compound interest.

Calculate the amount they repay at the end of the 4 years.
Give your answer correct to the nearest dollar.

\$ ..... [3]

(d) The café in the park sells water in bottles *A*, *B* and *C*.



NOT TO SCALE

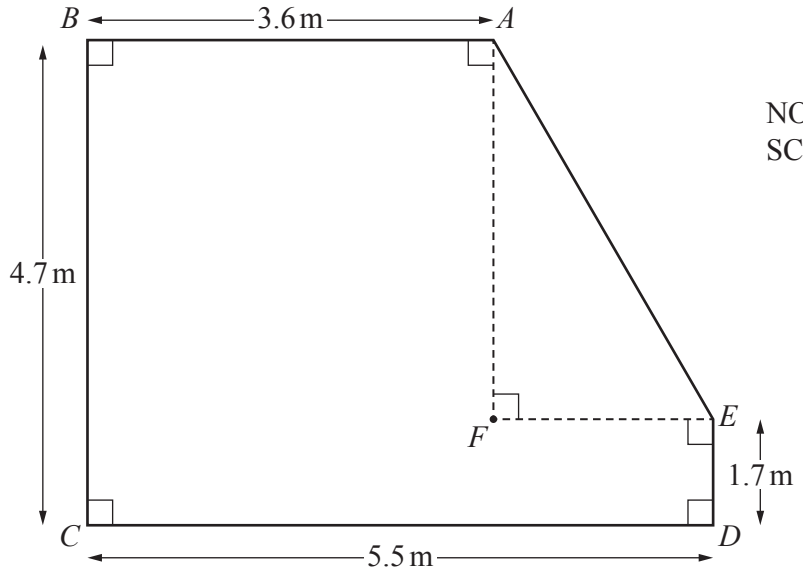
Bottle *A*	Bottle *B*	Bottle *C*
330 ml	500 ml	750 ml
\$1.98	\$3.20	\$5.10

Work out which bottle is the best value.
You must show all your working.

Bottle ..... [3]

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8



The diagram shows a plan, *ABCDE*, of the floor of a room in Jo's house.
F is a point inside the room.

(a) (i) Show that $EF = 1.9\,\text{m}$.

[1]

(ii) Work out *AF*.

$AF =$ ..... m [1]

(b) Calculate the area of the floor.

..... m^2 [3]

(c) A cupboard in the room is in the shape of a cuboid.
The area of the base of the cupboard is $1.2\,\text{m}^2$ and the height of the cupboard is 2.3 m.

Calculate the volume of the cupboard.
Give the units of your answer.

.... [2]

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(d) Jo buys 275 floor tiles which cost $1.64 each.

Calculate the total cost of the floor tiles.

$ ..... [1]

(e) Jo builds a patio in the shape of a semicircle with radius 2.3 m.

Calculate the area of the patio.

..... m^2 [2]

Question 9 is printed on the next page.

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9 **(a)** Sara rides her bicycle at a speed of 420 metres per minute.

Work out her speed in kilometres per hour.

..... km/h [2]

(b) Jan cycles a distance of 51 km.
She starts at 11 55.
She has a rest stop for 25 minutes.
She finishes at 14 41.

Calculate her average speed, in km/h, **for the time she is cycling**.

..... km/h [4]

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