Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

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2407779617

MATHEMATICS **0580/33**

Paper 3 (Core) **October/November 2015**

2 hours

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator
Tracing paper (optional)
Geometrical instruments

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
If working is needed for any question it must be shown below that question.
Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 104.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **16** printed pages.

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1 **(a)** Chip flies from New York to St Petersburg.
The plane takes off at 02 30 and arrives in St Petersburg at 19 35.
The local time in New York is 8 hours behind the local time in St Petersburg.

How long does the flight take?

Answer(a) ..... hours ..... min [2]

(b) Chip books a bus tour of St Petersburg.
The cost is $290 for each adult and $163 for each child.
There are 37 adults and 8 children on the bus.

(i) Calculate how much is paid altogether.

Answer(b)(i) $..... [3]

(ii) The bus has 53 seats for passengers.

Calculate the percentage of seats that are occupied.

Answer(b)(ii) ..... % [2]

(iii) Chip pays $290 for the bus tour.
The exchange rate is $1 = 33.2 rubles.

Work out the cost of the tour in rubles.

Answer(b)(iii) ..... rubles [1]

(c) St Isaac's cathedral in St Petersburg is 101 m high, correct to the nearest metre.

Complete the statement about the height, h metres, of St Isaac's cathedral.

Answer(c) ..... $\leqslant h <$ ..... [2]

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(d) Chip went on a cruise ship from St Petersburg. It visited four other ports.
30 guests are asked which port they enjoyed the most.
Each reply is listed below.

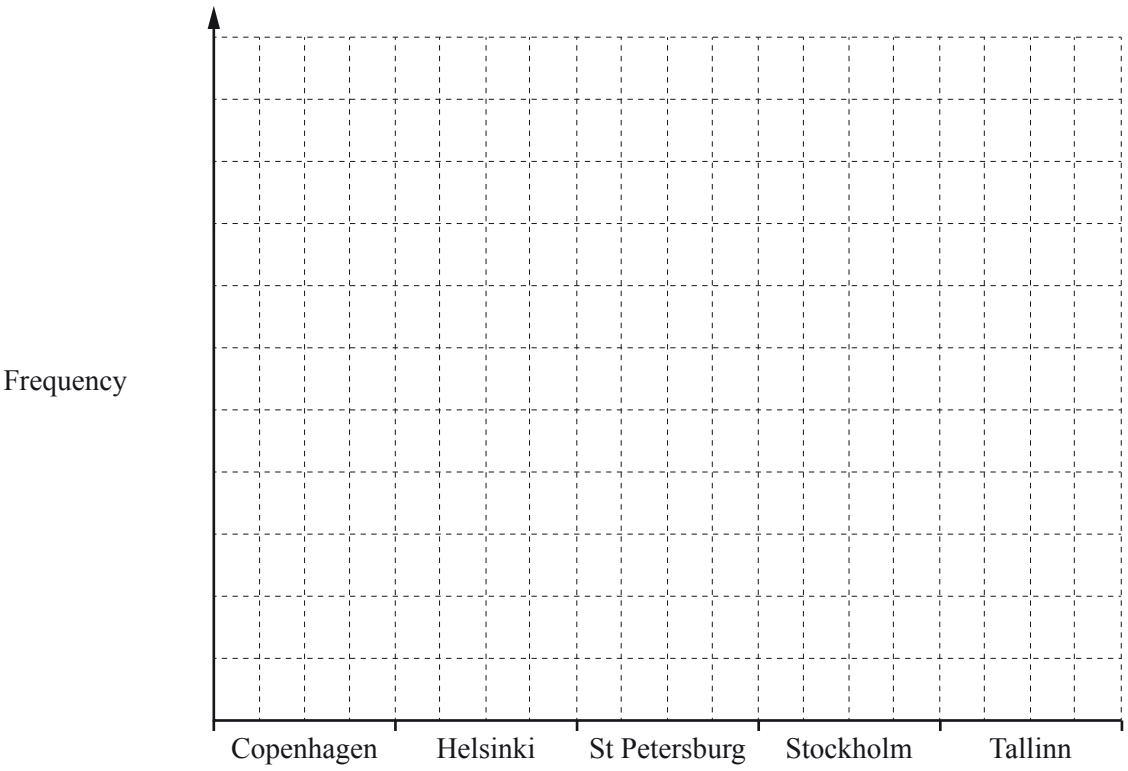
Stockholm	St Petersburg	St Petersburg	Helsinki	Tallinn	St Petersburg
Tallinn	Helsinki	Tallinn	Copenhagen	Tallinn	Copenhagen
St Petersburg	St Petersburg	Stockholm	St Petersburg	Stockholm	Helsinki
Helsinki	St Petersburg	Tallinn	Tallinn	St Petersburg	St Petersburg
Stockholm	Tallinn	St Petersburg	Helsinki	Tallinn	Copenhagen

(i) Complete the frequency table.
You may use the tally column to help you.

Port	Tally	Frequency
Copenhagen		
Helsinki		
St Petersburg		
Stockholm		
Tallinn		
	Total	30

[2]

(ii) Draw a bar chart to show this information.
Complete the scale on the frequency axis.



[3]

2 Kylie, Rio and Choi buy a horse for $21 600.

(a) They pay for the horse in the ratio Kylie : Rio : Choi = 2 : 3 : 4.

Calculate the amount that they each pay.

Answer(a) Kylie $.....

Rio $.....

Choi $..... [3]

(b) It costs $14 000 to keep the horse for one year.

(i) Food costs 30% of the $14 000.

Calculate the cost of the food.

Answer(b)(i) $..... [2]

(ii) Stable fees are $8000.

Write this as a fraction of the $14 000.
Give your answer in its lowest terms.

Answer(b)(ii) ..... [2]

(iii) It costs $600 for vets' fees and the rest of the $14 000 is spent on equipment.

Work out how much is spent on equipment.

Answer(b)(iii) $..... [2]

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(c) They later sell the horse for $17 280.

Calculate the percentage loss on the $21 600 they paid for the horse.

Answer(c) ..... % [3]

(d) Rio invests $5500 for 3 years at a rate of 2.5% per year compound interest.

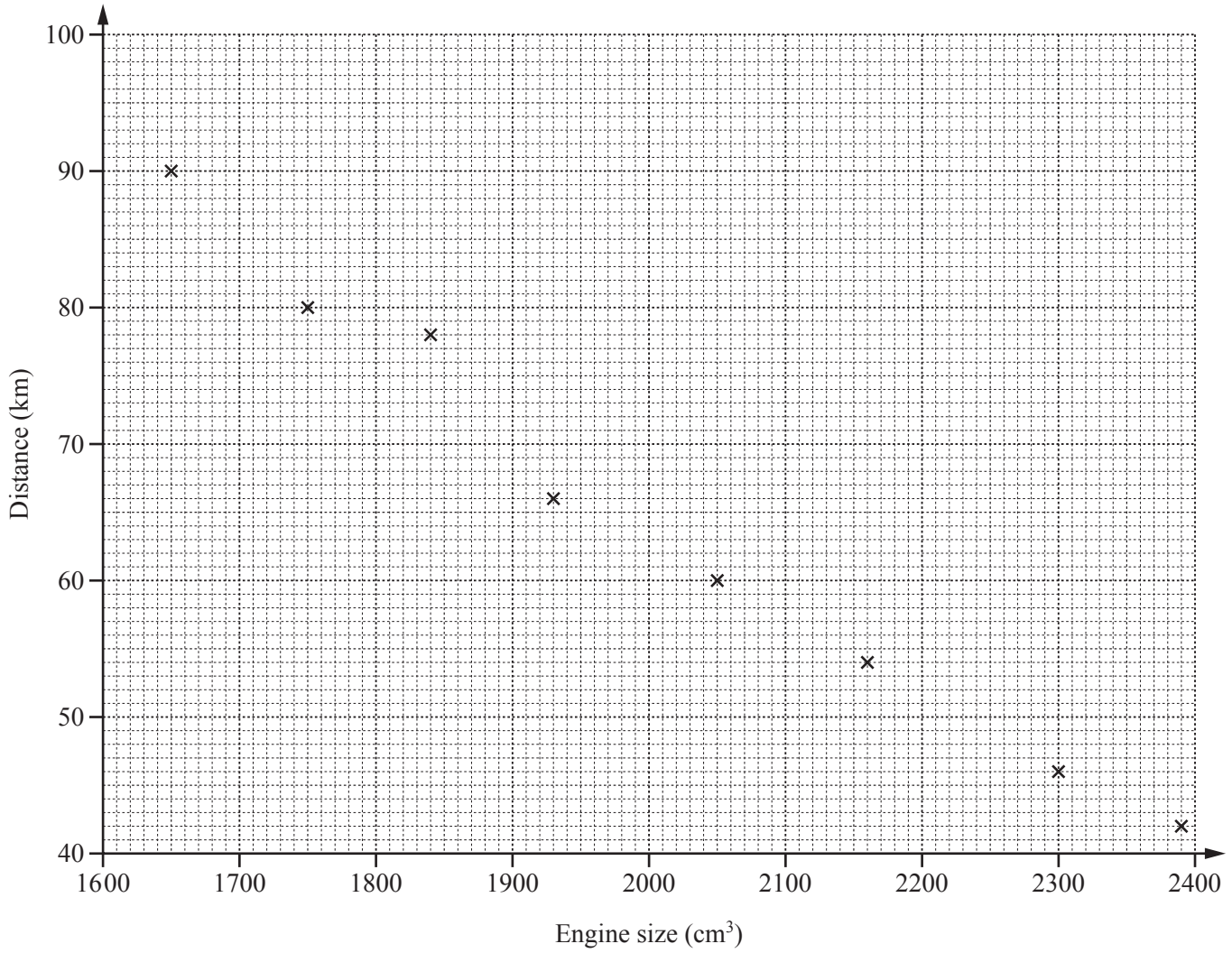
Calculate how much **interest** he receives after the 3 years.

Answer(d) $..... [3]

3 Bataar is comparing the engine size of a car with the distance it travels on one gallon of fuel.
The results for 12 cars are recorded in the table.

Engine size (cm^3)	1750	2160	1840	2390	1650	2300	1930	2050	1700	2000	2200	1900
Distance (km)	80	54	78	42	90	46	66	60	84	58	73	75

(a) (i) Complete the scatter diagram.
The first 8 points have been plotted for you.



[2]

(ii) On the scatter diagram, draw a line of best fit. [1]

(iii) What type of correlation is shown on the scatter diagram?

Answer(a)(iii) ..... [1]

(b) Bataar has recorded an incorrect distance in his table.

(i) Write down the distance that is most likely to be incorrect.

Answer(b)(i) ..... km [1]

(ii) Use your scatter diagram to estimate the correct distance for this car.

Answer(b)(ii) ..... km [1]

4 **(a)** Solve.

(i) $29 - x = 18$

Answer(a)(i) $x =$ ..... [1]

(ii) $4(2y + 7) = 164$

Answer(a)(ii) $y =$ ..... [3]

(b) Simplify.

$6x^4 \times 8x$

Answer(b) ..... [2]

(c) Find

(i) $\sqrt{81}$,

Answer(c)(i) ..... [1]

(ii) 7^3,

Answer(c)(ii) ..... [1]

(iii) 8^0.

Answer(c)(iii) ..... [1]

(d) **(i)** Write 6751 correct to the nearest hundred.

Answer(d)(i) ..... [1]

(ii) Write 0.25 as a fraction.

Answer(d)(ii) ..... [1]

(iii) Write 0.06 as a percentage.

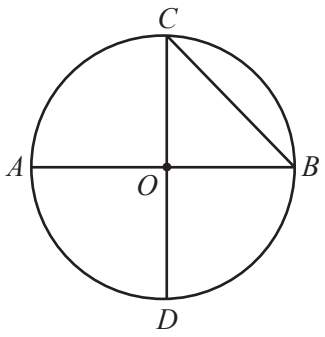
Answer(d)(iii) ..... % [1]

(iv) Write 687 000 000 in standard form.

Answer(d)(iv) ..... [1]

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5 **(a)** The diagram shows a circle, centre O.



NOT TO SCALE

Write down the mathematical name of the line

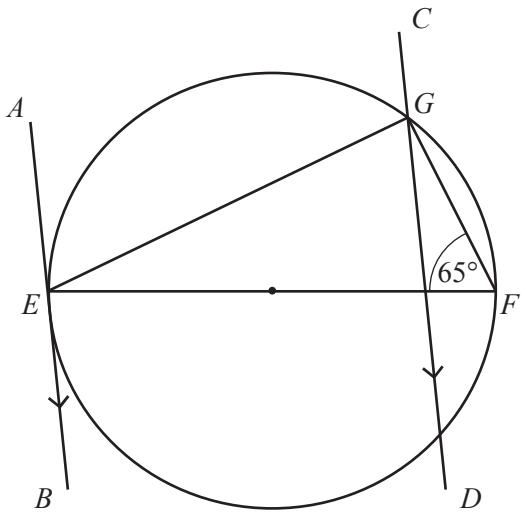
(i) OD,

Answer(a)(i) ..... [1]

(ii) BC.

Answer(a)(ii) ..... [1]

(b)



NOT TO SCALE

The diagram shows a circle with diameter EF.
AEB is a tangent to the circle at E.
CD is parallel to AB and angle $EFG = 65°$.

Calculate the size of the following angles, giving a reason for each answer.

(i) Angle EGF = ... because ..... [2]

(ii) Angle GEF = ... because ..... [2]

(iii) Angle AEG = ... because ..... [2]

(iv) Angle EGD = ... because ..... [2]

6 **(a)** Natalia has 16 reels of cotton.
6 reels are blue, 4 are white, 3 are red, 2 are black and 1 is green.

Natalia picks a reel at random.

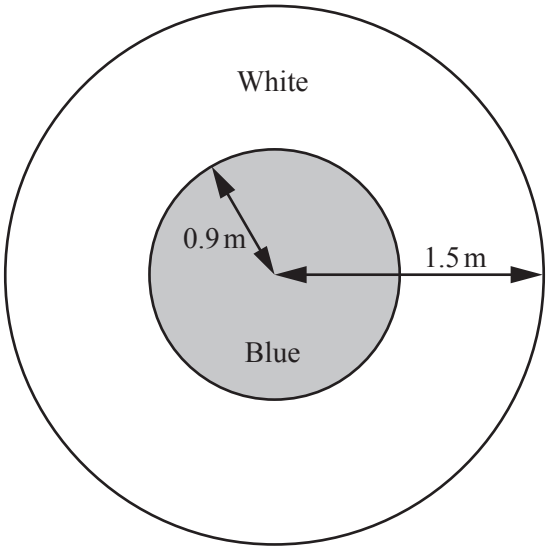
(i) Write down the colour she is most likely to pick.

Answer(a)(i) ..... [1]

(ii) Find the probability that she picks a black reel.

Answer(a)(ii) ..... [1]

(b) Natalia is making a circular tablecloth of radius 1.5 m using blue and white material.
The diagram shows this tablecloth.



NOT TO SCALE

(i) The radius of the blue circle is 0.9 m.

Work out the area of the white material shown in the diagram.

Answer(b)(i) ..... m^2 [3]

(ii) Natalia puts ribbon around the edge of the tablecloth.

Calculate the length of ribbon used.

Answer(b)(ii) ..... m [2]

(iii) Natalia buys 12 m of ribbon costing \$1.45 per metre.

Calculate the amount of change she receives from a \$20 note.

Answer(b)(iii) \$..... [2]

7 **(a)** Goat food is sold in 20 kg bags.
One goat eats $\frac{2}{5}$ of a bag of food each week.

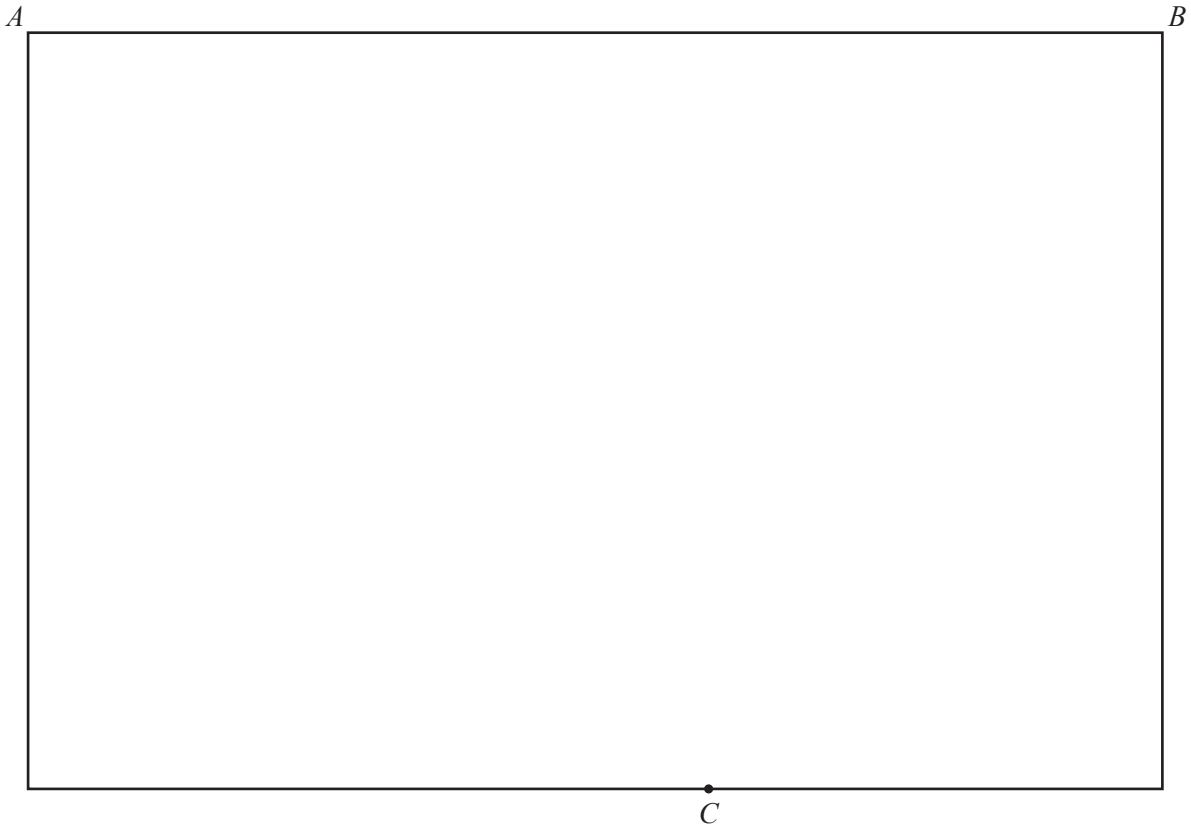
(i) Work out how many kilograms of food this goat eats in one week.

Answer(a)(i) ..... kg [1]

(ii) How many bags of food will the goat eat in 15 weeks?

Answer(a)(ii) ..... [2]

(b) This scale drawing shows a field.
The scale is 1 centimetre represents 2 metres.



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(i) Find the actual length of AB.

Answer(b)(i) ..... m [1]

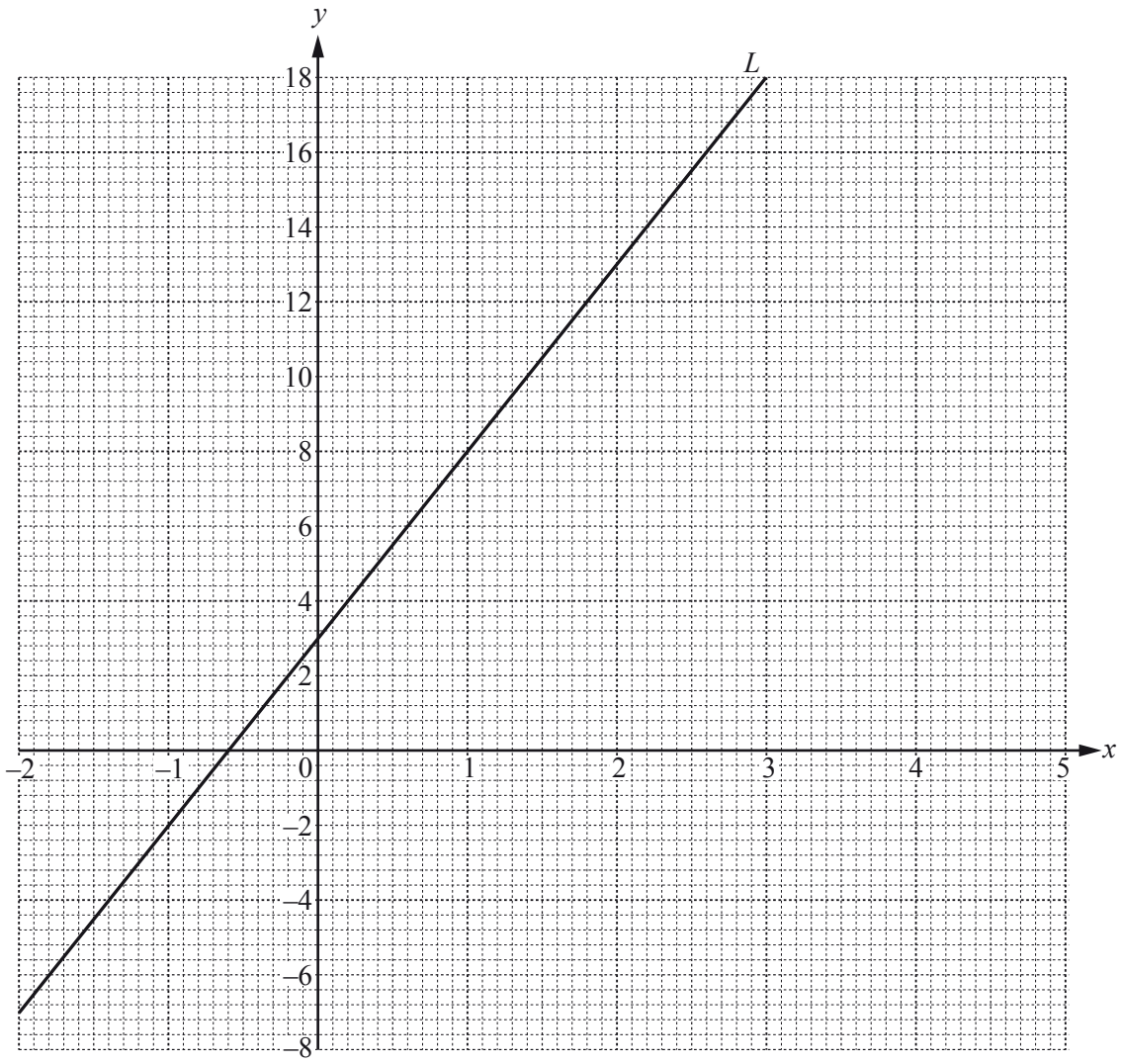
(ii) There are two goats in the field.
One goat is on a 14 m lead fastened at point B.
The other goat is on a 12 m lead fastened at point C.
There is a water trough positioned so that both goats can reach it.

Shade the area where the trough can be positioned. [3]

(iii) The trough holds 6.5 litres of water.
How many millilitres is this?

Answer(b)(iii) ..... ml [1]

8



(a) The line L is drawn on the grid.

Find the equation of the line in the form $y = mx + c$.

Answer(a) $y =$ ..... [3]

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

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

[3]

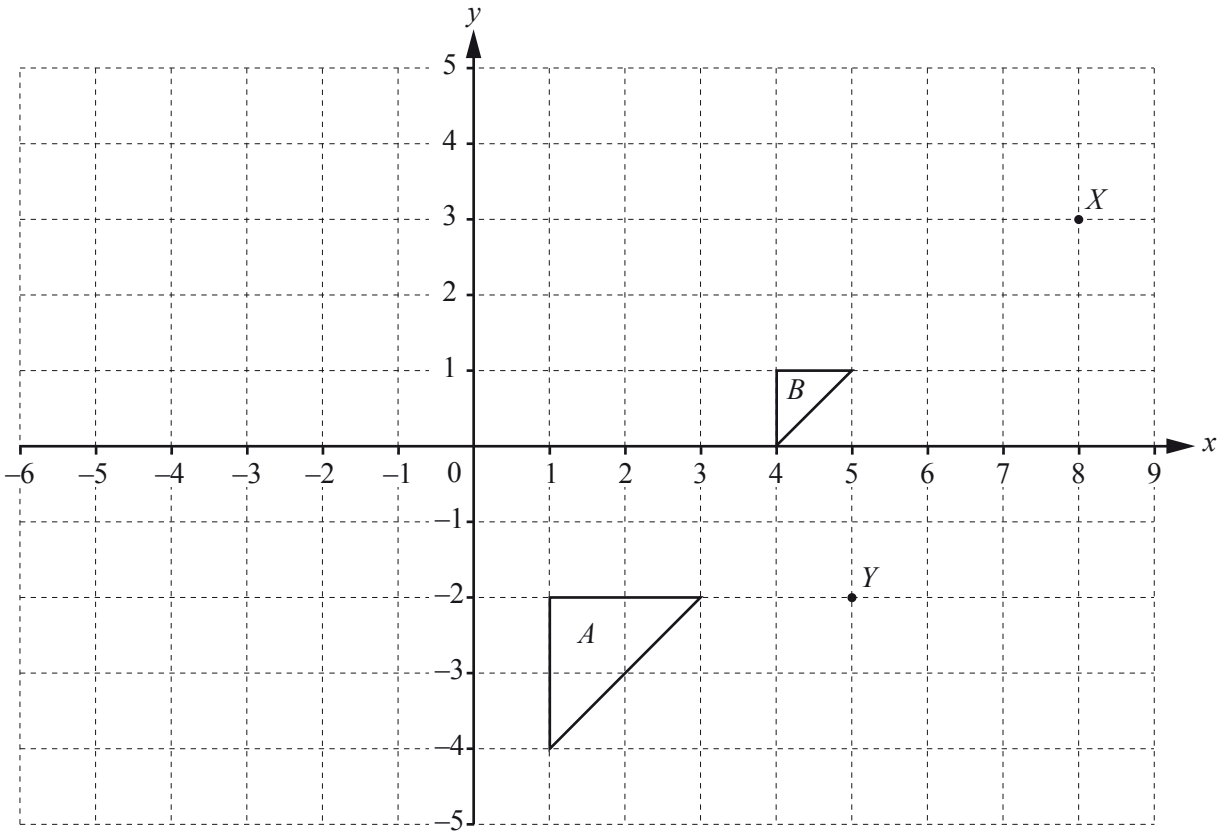
(ii) On the grid above, draw the graph of $y = x^2 - 4x - 2$ for $-2 \leqslant x \leqslant 5$. [4]

(iii) Use your graph to solve the equation $x^2 - 4x - 2 = 0$.

Answer(b)(iii) $x =$ ..... or $x =$ ..... [2]

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9



(a) (i) Rotate triangle A through 180° about (0, 0). [2]

(ii) Reflect triangle A in the line $x = -1$. [2]

(iii) Describe fully the **single** transformation that maps triangle A onto triangle B.

Answer(a)(iii) .....

..... [3]

(b) (i) Write down the co-ordinates of point Y.

Answer(b)(i) (..... , ...) [1]

(ii) Write $\overrightarrow{XY}$ as a column vector.

Answer(b)(ii) $\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(iii) $\overrightarrow{XZ} = \begin{pmatrix} -5 \\ 1 \end{pmatrix}$

On the grid, plot the point Z. [1]

Question 10 is printed on the next page.

10 The first three diagrams in a sequence are shown below.

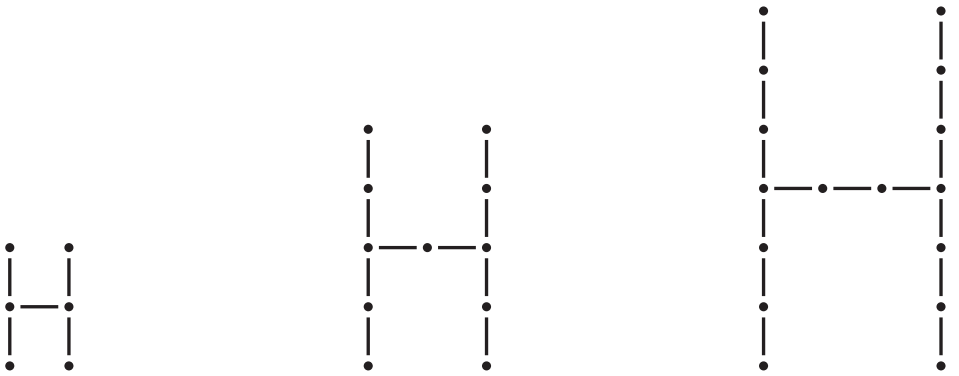


Diagram 1 Diagram 2 Diagram 3

(a) Complete the table for the number of lines and the number of dots in Diagram 3 and Diagram 4.

Diagram	1	2	3	4
Lines	5	10		
Dots	6	11		

[2]

(b) For Diagram n, write down an expression, in terms of n, for the number of

(i) lines,

Answer(b)(i) ..... [1]

(ii) dots.

Answer(b)(ii) ..... [1]

(c) Work out the number of lines and the number of dots in Diagram 20.

Answer(c) Number of lines = ...

Number of dots = ... [2]

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