

- 1 A school has a sponsored swim in summer and a sponsored walk in winter. In 2010, the school raised a total of \$1380. The ratio of the money raised in summer : winter = 62 : 53.

(a) (i) Show clearly that \$744 was raised by the swim in **summer**.

Answer (a)(i)

[1]

(ii) Alesha's swim raised \$54.10. Write this as a percentage of \$744.

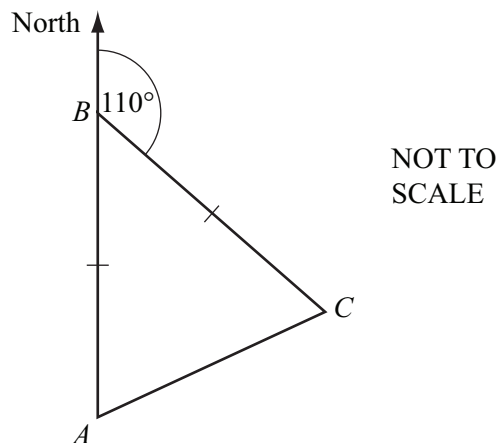
Answer(a)(ii) % [1]

(iii) Bryan's swim raised \$31.50. He received 75 cents for each length of the pool which he swam.

Calculate the number of lengths Bryan swam.

Answer(a)(iii) [2]

(b) The route for the **sponsored walk in winter** is triangular.

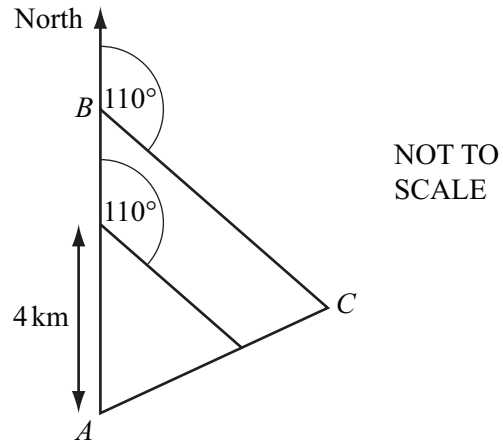


(i) Senior students start at *A*, walk North to *B*, then walk on a bearing 110° to *C*. They then return to *A*. $AB = BC$.

Calculate the bearing of *A* from *C*.

Answer(b)(i) [3]

(ii)



$AB = BC = 6$ km.

Junior students follow a **similar** path but they only walk 4 km North from A , then 4 km on a bearing 110° before returning to A .

Senior students walk a total of 18.9 km.

Calculate the distance walked by junior students.

Answer(b)(ii) km [3]

(c) The total amount, \$1380, raised in 2010 was 8% **less** than the total amount raised in 2009.

Calculate the total amount raised in 2009.

Answer(c) \$ [3]

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2 In this question give all your answers as fractions.

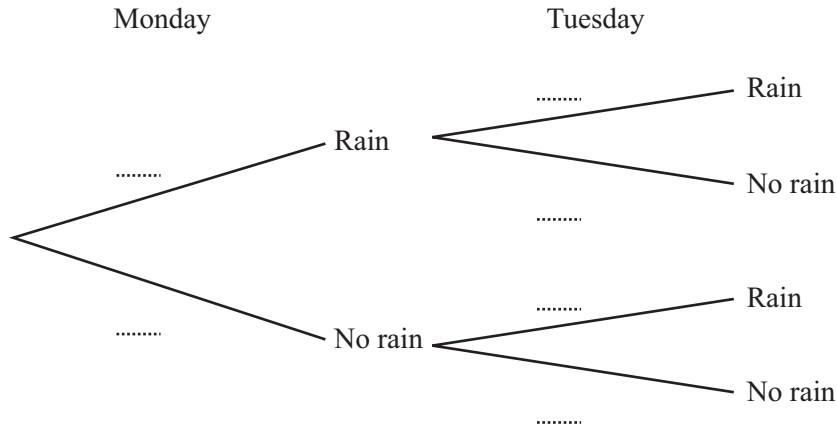
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The probability that it rains on Monday is $\frac{3}{5}$.

If it rains on Monday, the probability that it rains on Tuesday is $\frac{4}{7}$.

If it does not rain on Monday, the probability that it rains on Tuesday is $\frac{5}{7}$.

(a) Complete the tree diagram.



[3]

(b) Find the probability that it rains

(i) on **both** days,

Answer(b)(i) [2]

(ii) on Monday but not on Tuesday,

Answer(b)(ii) [2]

(iii) on **only one** of the two days.

Answer(b)(iii) [2]

(c) If it does **not** rain on Monday and it does **not** rain on Tuesday, the probability that it does **not** rain on Wednesday is $\frac{1}{4}$.

Calculate the probability that it rains on **at least one** of the three days.

Answer(c) [3]

- 3 (a) p varies **inversely** as $(m + 1)$.

When $p = 4$, $m = 8$.

Find the value of p when $m = 11$.

Answer(a) $p =$ [3]

- (b) (i) Factorise $x^2 - 25$.

Answer(b)(i) [1]

- (ii) Simplify $\frac{2x^2 + 11x + 5}{x^2 - 25}$.

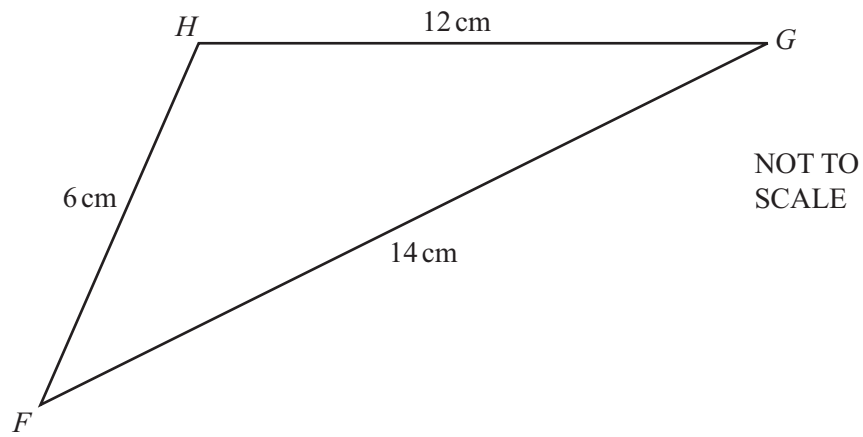
Answer(b)(ii) [3]

- (c) Solve the inequality $5(x - 4) < 3(12 - x)$.

Answer(c) [3]

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4 (a)



For
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Use

The diagram shows triangle FGH , with $FG = 14$ cm, $GH = 12$ cm and $FH = 6$ cm.

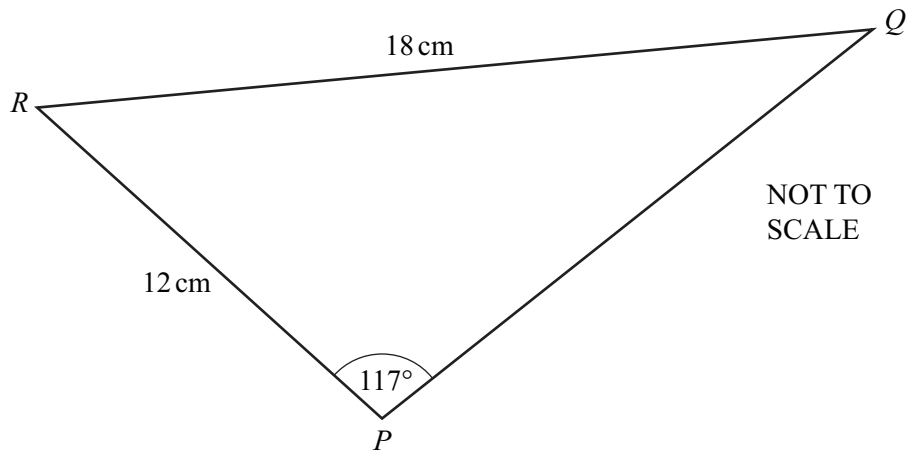
(i) Calculate the size of angle HFG .

Answer(a)(i) Angle $HFG = \dots\dots\dots$ [4]

(ii) Calculate the area of triangle FGH .

Answer(a)(ii) $\dots\dots\dots$ cm² [2]

(b)

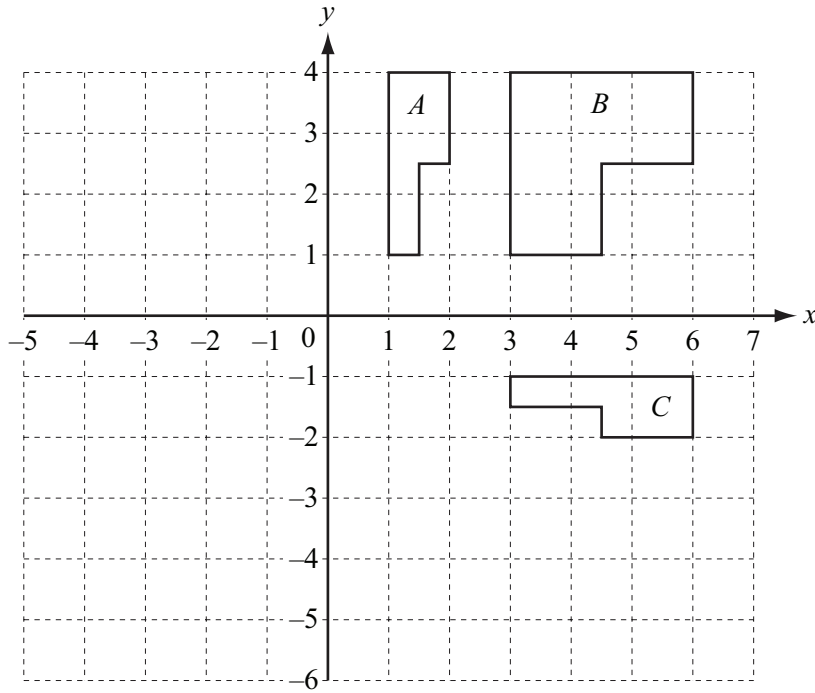


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The diagram shows triangle PQR , with $RP = 12\text{ cm}$, $RQ = 18\text{ cm}$ and angle $RPQ = 117^\circ$.

Calculate the size of angle RQP .

Answer(b) Angle $RQP = \dots\dots\dots$ [3]



(a) On the grid above, draw the image of

(i) shape *A* after translation by the vector $\begin{pmatrix} -3 \\ -2 \end{pmatrix}$, [2]

(ii) shape *A* after reflection in the line $x = -1$. [2]

(b) Describe fully the **single** transformation which maps

(i) shape *A* onto shape *B*,

Answer(b)(i) [3]

(ii) shape *A* onto shape *C*.

Answer(b)(ii) [3]

(c) Find the matrix representing the transformation which maps shape *A* onto shape *B*.

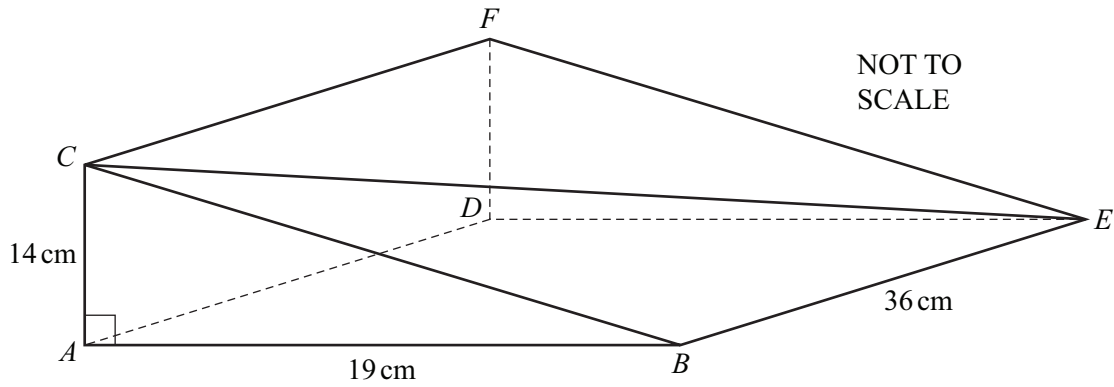
Answer(c) $\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

(d) Describe fully the **single** transformation represented by the matrix $\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$.

Answer(d) [3]

6

For
Examiner's
Use



In the diagram, $ABCDEF$ is a prism of length 36 cm.
The cross-section ABC is a right-angled triangle.
 $AB = 19$ cm and $AC = 14$ cm.

Calculate

- (a) the length BC ,

Answer(a) $BC = \dots\dots\dots$ cm [2]

- (b) the total surface area of the prism,

Answer(b) $\dots\dots\dots$ cm² [4]

- (c) the volume of the prism,

Answer(c) $\dots\dots\dots$ cm³ [2]

- (d) the length CE ,

Answer(d) $CE = \dots\dots\dots$ cm [2]

- (e) the angle between the line CE and the base $ABED$.

Answer(e) $\dots\dots\dots$ [3]

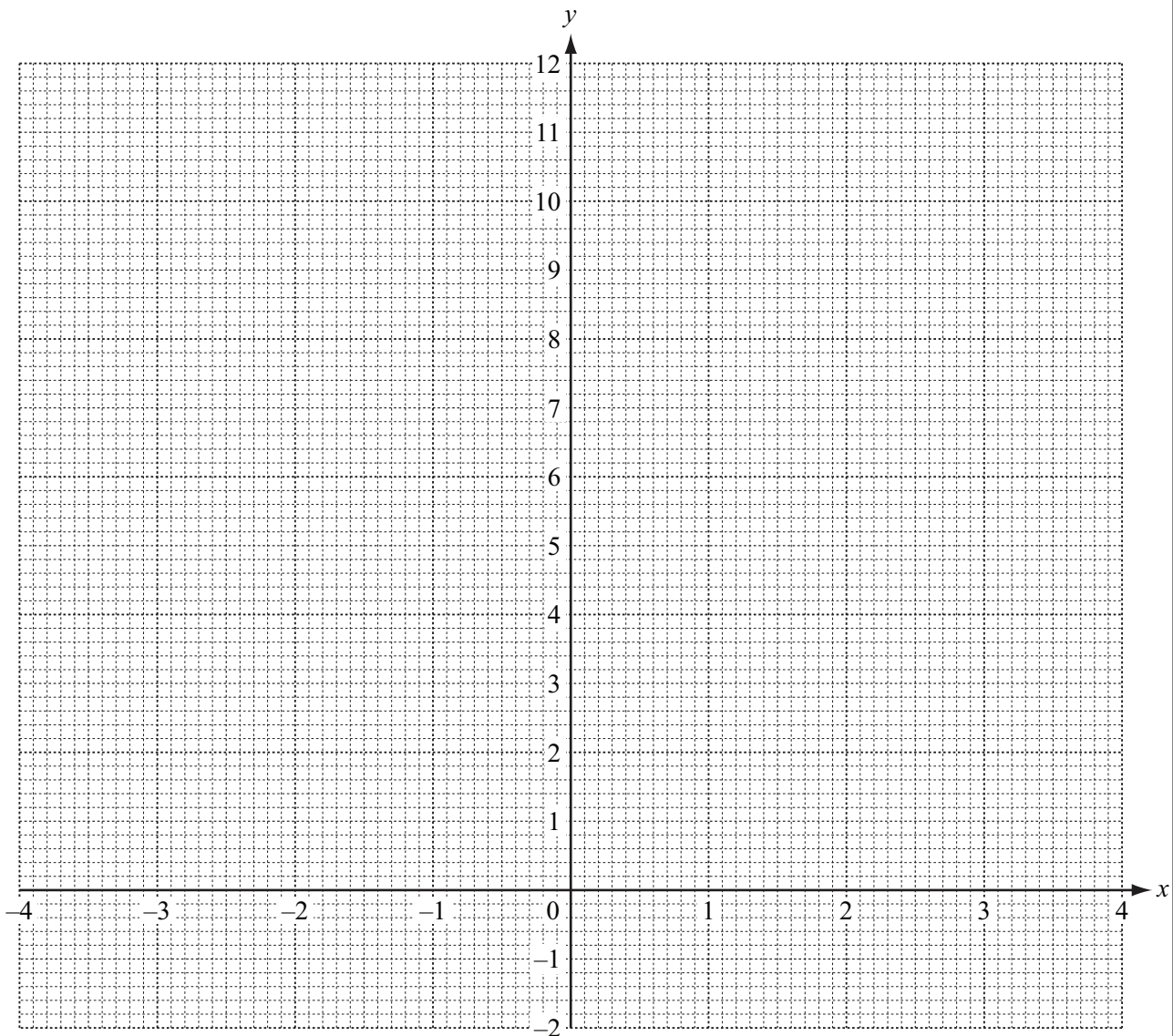
- 7 (a) Complete the table of values for the equation $y = \frac{4}{x^2}$, $x \neq 0$.

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x	-4	-3	-2	-1	-0.6		0.6	1	2	3	4
y	0.25	0.44			11.11			4.00		0.44	

[3]

- (b) On the grid, draw the graph of $y = \frac{4}{x^2}$ for $-4 \leq x \leq -0.6$ and $0.6 \leq x \leq 4$.



[5]

- (c) Use your graph to solve the equation $\frac{4}{x^2} = 6$.

For
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Answer(c) $x = \dots\dots\dots$ or $x = \dots\dots\dots$ [2]

- (d) By drawing a suitable tangent, estimate the gradient of the graph where $x = 1.5$.

Answer(d) $\dots\dots\dots$ [3]

- (e) (i) The equation $\frac{4}{x^2} - x + 2 = 0$ can be solved by finding the intersection of the graph of $y = \frac{4}{x^2}$ and a straight line.

Write down the equation of this straight line.

Answer(e)(i) $\dots\dots\dots$ [1]

- (ii) On the grid, draw the straight line from your answer to **part (e)(i)**. [2]

- (iii) Use your graphs to solve the equation $\frac{4}{x^2} - x + 2 = 0$.

Answer(e)(iii) $x = \dots\dots\dots$ [1]

- 8 The table below shows the marks scored by a group of students in a test.

Mark	11	12	13	14	15	16	17	18
Frequency	10	8	16	11	7	8	6	9

- (a) Find the mean, median and mode.

Answer(a) mean =

median =

mode = [6]

- (b) The table below shows the time (t minutes) taken by the students to complete the test.

Time (t)	$0 < t \leq 10$	$10 < t \leq 20$	$20 < t \leq 30$	$30 < t \leq 40$	$40 < t \leq 50$	$50 < t \leq 60$
Frequency	2	19	16	14	15	9

- (i) Cara rearranges this information into a new table.

Complete her table.

Time (t)	$0 < t \leq 20$	$20 < t \leq 40$	$40 < t \leq 50$	$50 < t \leq 60$
Frequency				9

[2]

- (ii) Cara wants to draw a histogram to show the information in **part (b)(i)**.

Complete the table below to show the interval widths and the frequency densities.

	$0 < t \leq 20$	$20 < t \leq 40$	$40 < t \leq 50$	$50 < t \leq 60$
Interval width				10
Frequency density				0.9

[3]

(c) **Some** of the students were asked how much time they spent revising for the test.

10 students revised for 2.5 hours, 12 students revised for 3 hours and n students revised for 4 hours.

The mean time that **these** students spent revising was 3.1 hours.

Find n .

Show all your working.

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Answer(c) n = [4]

9 Peter wants to plant x plum trees and y apple trees.

He wants at least 3 plum trees and at least 2 apple trees.

(a) Write down one inequality in x and one inequality in y to represent these conditions.

Answer(a) , [2]

(b) There is space on his land for no more than 9 trees.

Write down an inequality in x and y to represent this condition.

Answer(b) [1]

(c) Plum trees cost \$6 and apple trees cost \$14.

Peter wants to spend no more than \$84.

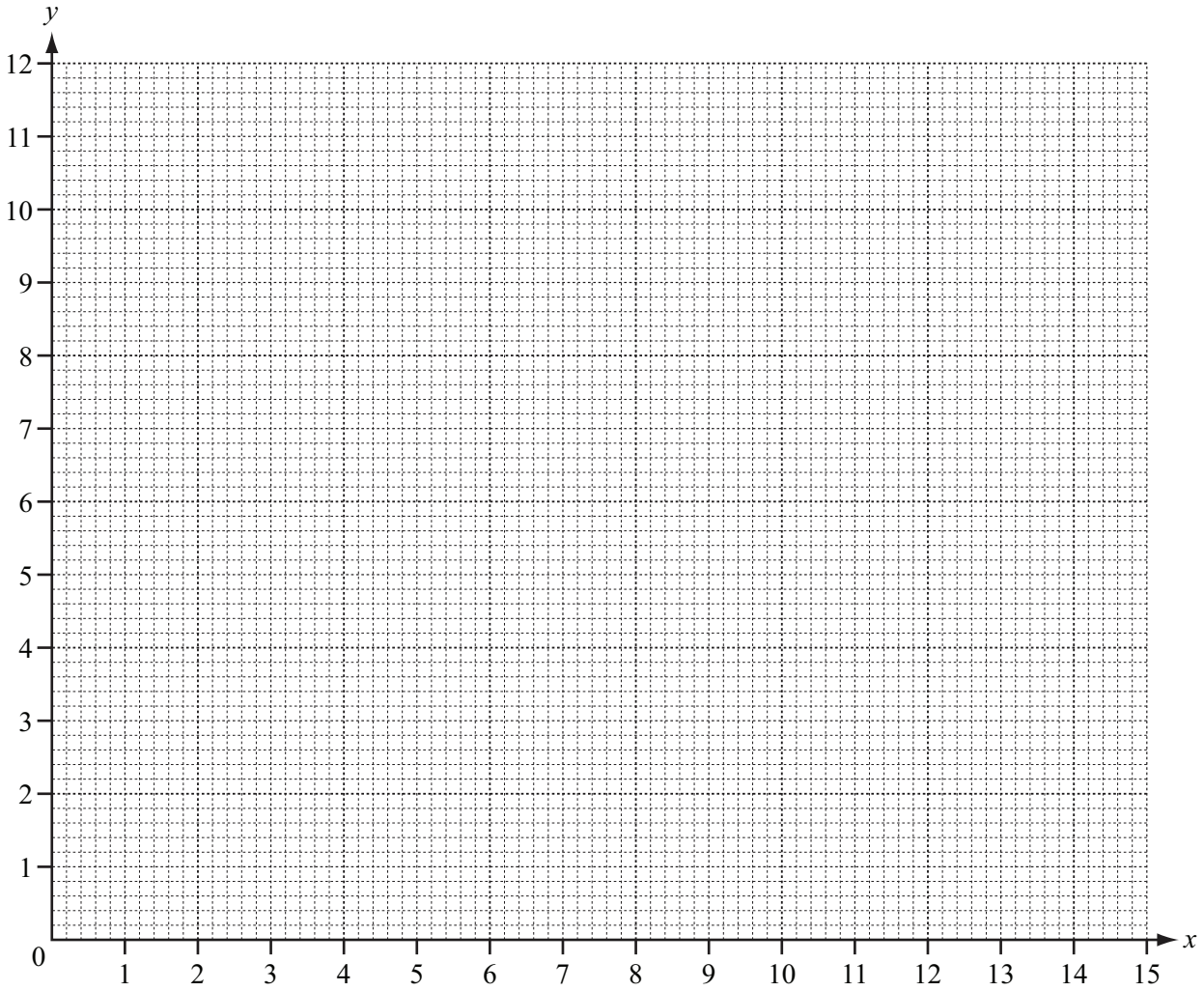
Write down an inequality in x and y , and show that it simplifies to $3x + 7y \leq 42$.

Answer(c)

[1]

(d) On the grid, draw four lines to show the four inequalities and shade the **unwanted** regions.

*For
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Use*



[7]

(e) Calculate the smallest cost when Peter buys a total of 9 trees.

Answer(e) \$ [2]

Question 10 is printed on the next page.

10 The first and the n th terms of sequences A , B and C are shown in the table below.

(a) Complete the table for each sequence.

	1st term	2nd term	3rd term	4th term	5th term	n th term
Sequence A	1					n^3
Sequence B	4					$4n$
Sequence C	4					$(n + 1)^2$

[5]

(b) Find

(i) the 8th term of sequence A ,

Answer(b)(i) [1]

(ii) the 12th term of sequence C .

Answer(b)(ii) [1]

(c) (i) Which term in sequence A is equal to 15 625?

Answer(c)(i) [1]

(ii) Which term in sequence C is equal to 10 000?

Answer(c)(ii) [1]

(d) The first four terms of sequences D and E are shown in the table below.

Use the results from **part (a)** to find the 5th and the n th terms of the sequences D and E .

	1st term	2nd term	3rd term	4th term	5th term	n th term
Sequence D	5	16	39	80		
Sequence E	0	1	4	9		

[4]

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