RECOGNISING ACHIEVEMENT

Oxford Cambridge and RSA Examinations

General Certificate of Secondary Education

MATHEMATICS SYLLABUS A

PAPER 3
INTERMEDIATE TIER

1962/3

Specimen Paper 2003

Additional materials: Geometrical instruments
Tracing paper (optional).

TIME 2 hours

Candidate Name	Centre Number	Candidate Number

INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your Centre number and Candidate number in the boxes above.
- *Answer all the questions*.
- Write your answers, in blue or black ink, in the spaces provided on the question paper.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Show your working. Marks may be given for working that shows that you know how to solve the problem even if you get the answer wrong.

YOU ARE NOT ALLOWED TO USE A CALCULATOR IN THIS EXAM.

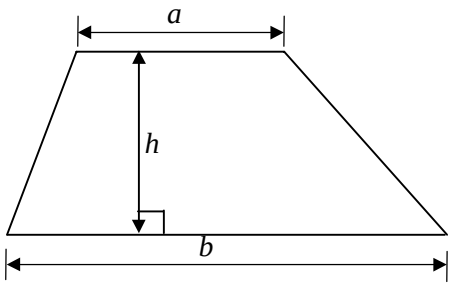
INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.

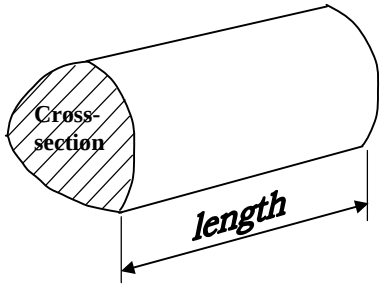
For examiner's use only

FORMULAE SHEET: INTERMEDIATE TIER

Area of trapezium = $\frac{1}{2}(a + b)h$



Volume of prism = (area of cross section) × length



1 **(a)** Work out

(i) 2^4,

_____

Answer (a)(i) _____ **[1]**

(ii) 3^3,

_____

Answer (ii) _____ **[1]**

(b) Write down the next two terms of the sequence

21, 15, 9, _____ , _____

[2]

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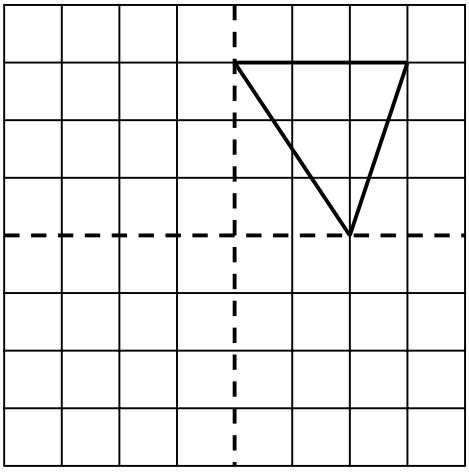
2 The diagram shows part of a design.
The dotted lines are lines of symmetry of the whole design.

Complete the design.



3 A hairdresser buys shampoo in 2.5 litre containers.
She buys 6 of these containers.

(a) How many millilitres of shampoo is this?

Answer (a) _____ml **[2]**

Because the containers are bulky, the hairdresser pours shampoo into a small bottle.
When the small bottle is full it will hold 200 ml. When it is empty she refills the bottle.
During the process of filling the small bottle she spills 5% of the shampoo.

(b) How many times can she fill the small bottle?
Show all your working clearly.

Answer (b) _____ **[6]**

4 There are blue, red and yellow discs in a bag.
When a disc is picked out at random, the probability of it being red is 0.4 and the probability of it being blue is 0.3.

(a) What is the probability of picking a yellow disc?

Answer (a) _____ **[2]**

There are 60 discs in the bag.

(b) Work out how many of them are red.

Answer (b) _____ **[2]**

5 **(a)** Simplify $3x + 4y - 2x + 7y$.

Answer (a) _____ **[2]**

(b) Solve the equations

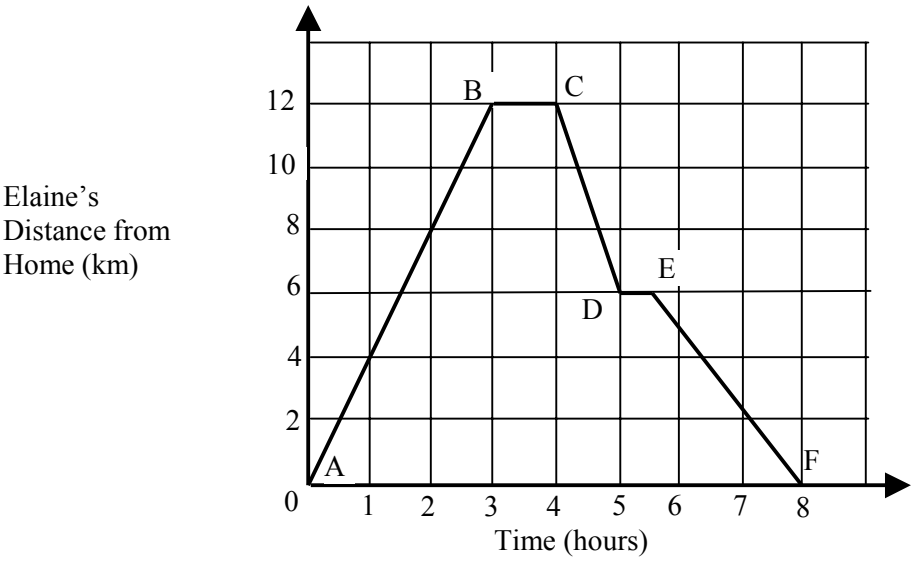
(i) $2(3x - 2) = 50$,

Answer (b)(i) $x =$ _____ **[3]**

(ii) $7x = 6 + 3x$.

Answer (ii) $x =$ _____ **[2]**

6 **(a)** Elaine went for a walk.
Her walk is represented by the graph below.



(i) Describe the part of her walk represented by the sections CD, DE and EF.

Answer (a) (i)

_____

_____

_____

_____

_____ **[2]**

(ii) On which section of the walk did she walk fastest?

Answer (ii) _____ **[1]**

(iii) What was her average speed for the first 2 hours?

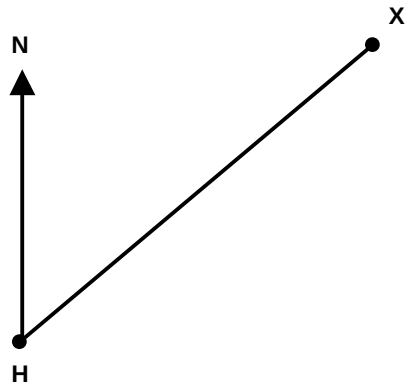
_____

_____

_____

Answer (iii) _____km/h **[2]**

6 **(b)** The diagram shows the position of Elaine's house, H, and her position, X, on another of her walks.
The scale of the diagram is 1 cm represents 2 km.



(i) Measure and write down the bearing and distance, in km, of X from H.

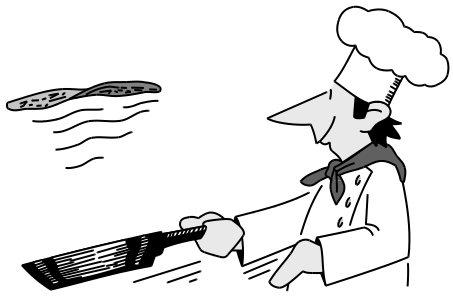
Answer (b)(i) Bearing _____ °

Distance _____ km **[2]**

Elaine then walks to a position, Y, which is 15 km from H and on a bearing of 260° from H.

(ii) Mark the position of Y on the diagram. **[2]**

7 **(a)** A recipe for pancake mixture is as follows.



To make 10 pancakes	
300 ml	milk
124 g	plain flour
2	eggs
½teaspoon	salt

Complete the list of ingredients for 15 pancakes.

To make 15 pancakes

_____ milk
_____ plain flour
_____ eggs
_____ teaspoon salt

[4]

(b) A book on dieting states that one pancake contains 155 Calories, correct to the nearest Calorie.

Write down the greatest and least number of Calories that one pancake could contain.

Answer (b) Greatest _____

Least _____ **[2]**

(c) A frying pan is used to cook the pancakes.
The inside base of the frying pan is a circle of radius 10cm.

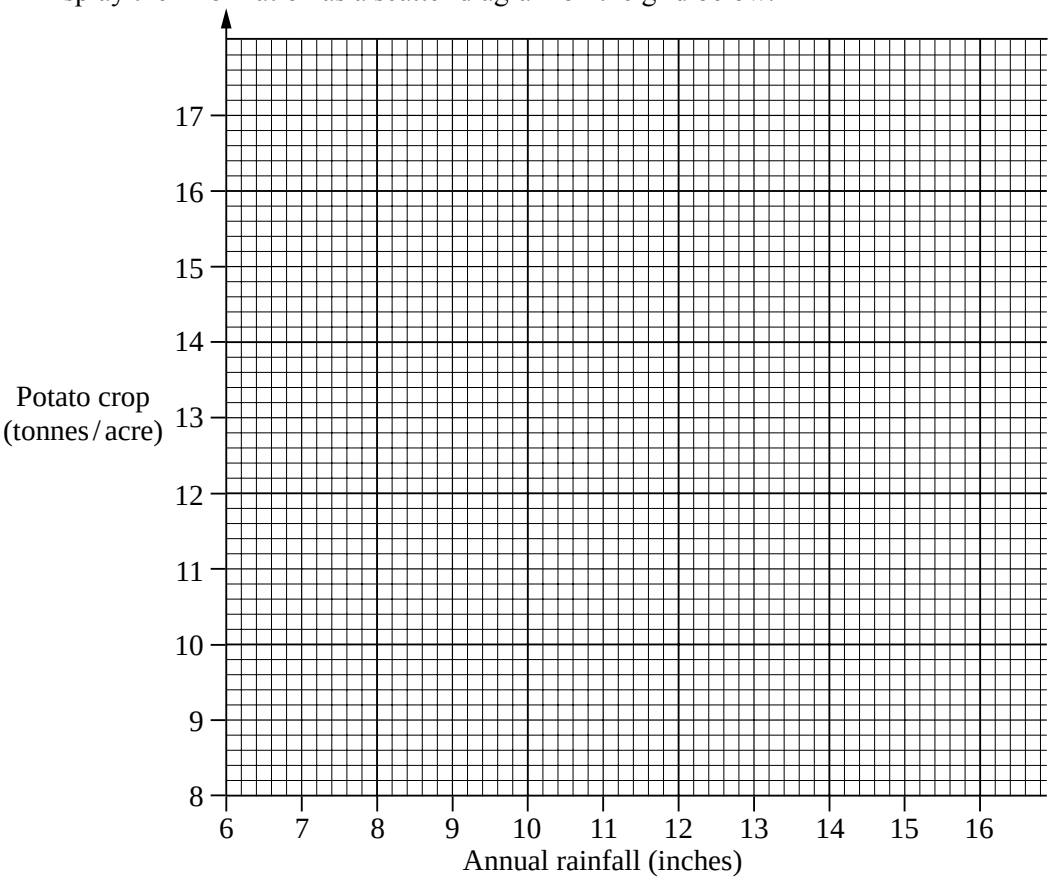
Work out the area of the inside base of the frying pan.
Take the value of π to be 3.14159.
Give your answer to an appropriate degree of accuracy.

Answer (c) _____ cm^2 **[3]**

8 A farmer recorded the amount of rainfall and the size of his potato crop for seven years. The results are given below.

Annual Rainfall (inches)	9.6	8.2	11.2	6.8	13.6	13.0	15.0
Potato crop (tonnes/acre)	13.2	11.8	12.8	10.2	15.0	14.4	16.4

(a) Display the information as a scatter diagram on the grid below.



[2]

(a) Describe the correlation shown in your scatter diagram.

Answer (b)

_____ **[1]**

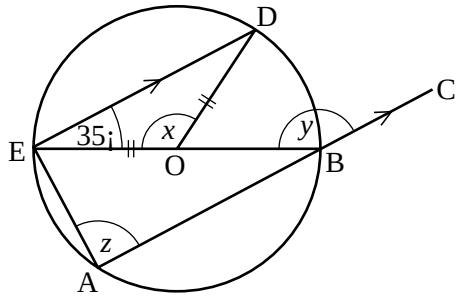
(c) Draw a line of best fit on your scatter diagram. **[1]**

(d) Use your line of best fit to estimate the size of the potato crop after a rainfall of 12 inches.

Answer (d) _____ tonnes/acre **[1]**

9 In the diagram, lines ABC and ED are parallel.
EOB is a diameter of the circle, centre O.
Angle OED = 35°.

NOT TO SCALE



(a) Find the size of

(i) angle *x*,

_____

_____

Answer (a)(i) _____ **[2]**

(ii) angle *y*.

_____

_____

Answer (ii) _____ **[2]**

(b) Write down the size of angle *z*.
Give a reason for your answer.

Answer (b) z = _____

Reason _____

_____

_____ **[2]**

10 A group of students went to a fast food restaurant.

(a) $\frac{2}{5}$ of them bought a beef burger and $\frac{1}{3}$ of them bought a chicken burger. The rest of them just bought drinks.

What fraction of the group bought food?

Answer (a) _____ **[2]**

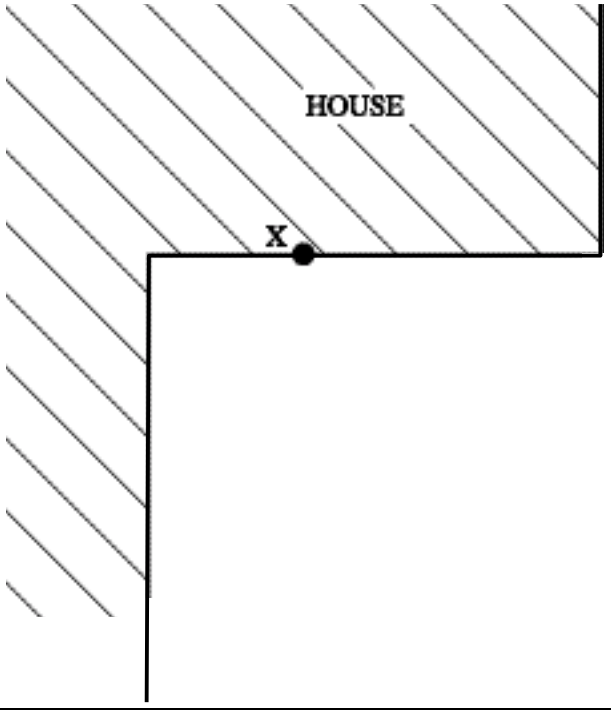
(b) $\frac{3}{4}$ of those who bought a beef burger also bought chips.
What fraction of the whole group bought beef burger and chips?

Give your answer as a fraction in its simplest form.

Answer (b) _____ **[2]**

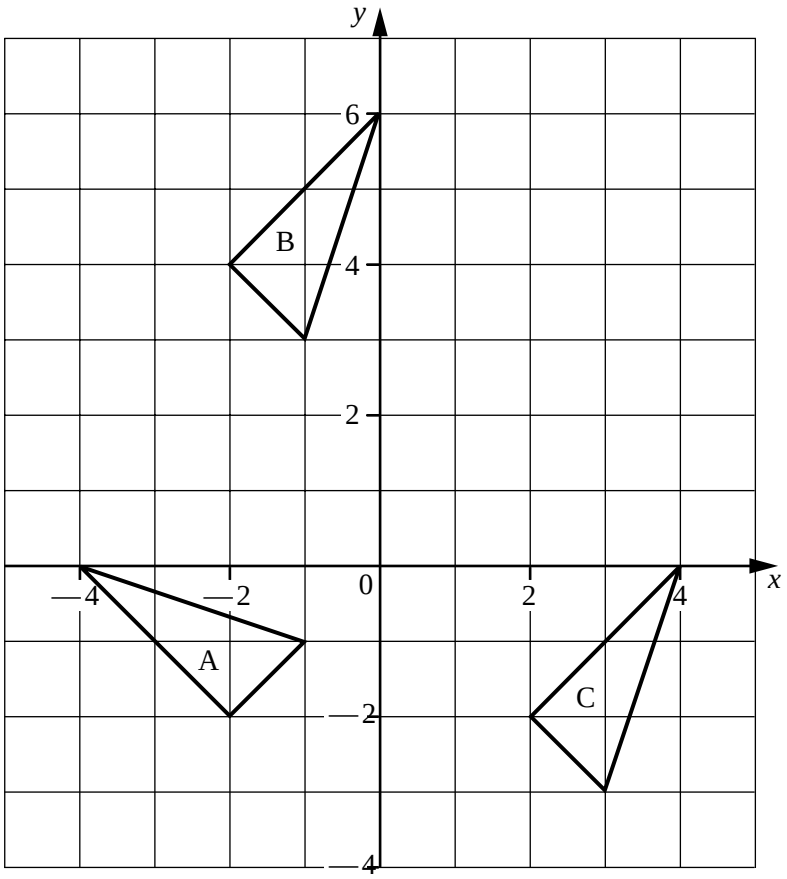
11 The diagram shows the wall of a house drawn to a scale of 2 cm to 1 m.
A dog is fastened by a lead 3m long to a point X on a wall.

Shade on the diagram the area that the dog can reach.



[4]

12



(a) Find the centre of the rotation which maps triangle A on to triangle B.

Answer (a) _____ , _____ **[1]**

(b) Describe the single transformation which maps triangle B onto triangle C.

Answer (b) _____

_____

_____ **[2]**

13 **(a)** Find the value of 24 multiplied by the reciprocal of 24

Show clear working to explain your answer.

Answer (a) _____ **[2]**

(b) James said, "Five divided by zero is five".

What answer should he have given?

Answer (b) _____ **[1]**

(c) Jagdeep said, 'The square root of a number is always smaller than the number itself.'

Is he correct?

Give an example to support your answer.

Answer (c) _____

[2]

(d) **(i)** Write sixty thousand in standard form.

Answer (a)(i) _____ **[1]**

Hence, or otherwise, find

(i) the value of the square of sixty thousand.

Give your answer in standard form.

Answer (ii) _____ **[2]**

14 **(a)** Simplify

(i) $p^4 \times p^3$,

Answer(a) (i) _____ **[1]**

(ii) $\frac{12t^5}{3t^2}$

Answer (ii) _____ **[1]**

(b) Solve
$3x + 19 > 4$.

Answer (b) _____ **[2]**

(c) Rearrange the following formula to make w the subject .

$s = \frac{w+y}{2}$

Answer (c) _____ **[2]**

15 A manufacturer investigates how far a car travels before it needs new tyres.
The distances covered by 100 cars before they needed new tyres is shown in the table below.

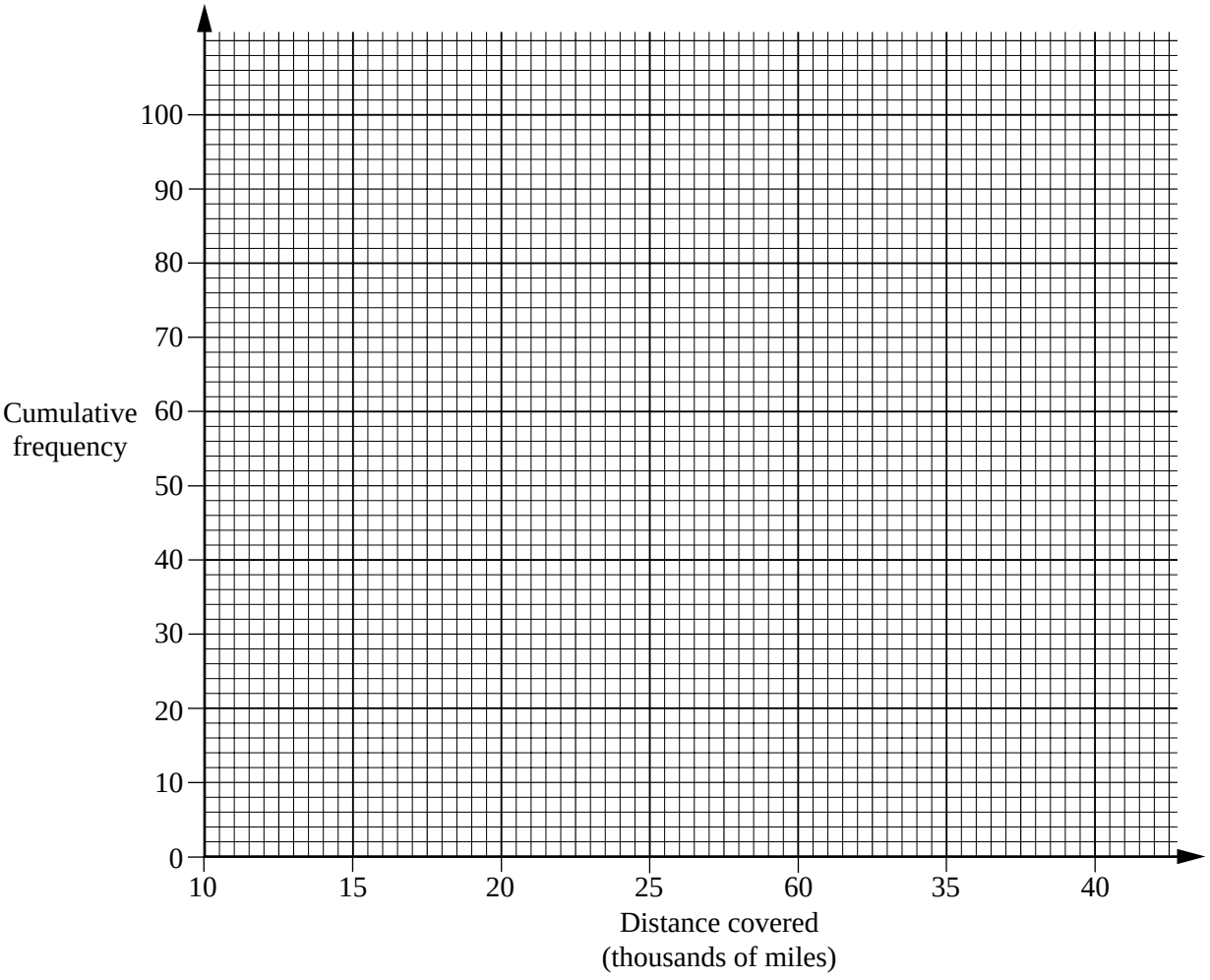
Distance covered (x thousands of miles)	Number of cars
$10 < x \leq 15$	10
$15 < x \leq 20$	23
$20 < x \leq 25$	31
$25 < x \leq 30$	19
$30 < x \leq 35$	12
$35 < x \leq 40$	5

(a) Complete the cumulative frequency table for the 100 cars.

Distance covered (x thousand miles)	$x \leq 15$	$x \leq 20$	$x \leq 25$	$x \leq 30$	$x \leq 35$	$x \leq 40$
Cumulative Frequency	10					

[1]

(b) Draw the cumulative frequency diagram on the grid below.



[3]

15 **(c)** Use your cumulative frequency diagram to estimate the median distance covered.

Answer (c) _____thousand miles **[1]**

(d) Use your diagram to estimate how many cars travelled less than 23000 miles before needing new tyres.

Answer (d) _____ **[1]**

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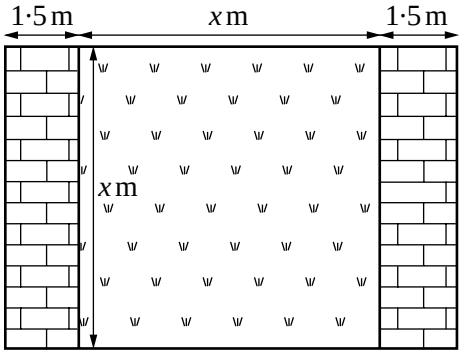
16 A rectangular garden is made up of a square lawn of side x m and 2 paths 1.5 m wide, as shown in the diagram.

The total area of the garden is 88 m^2.

Write down an equation in x and solve it to find the dimensions of the lawn.



NOT TO SCALE

Answer _____ m **[5]**

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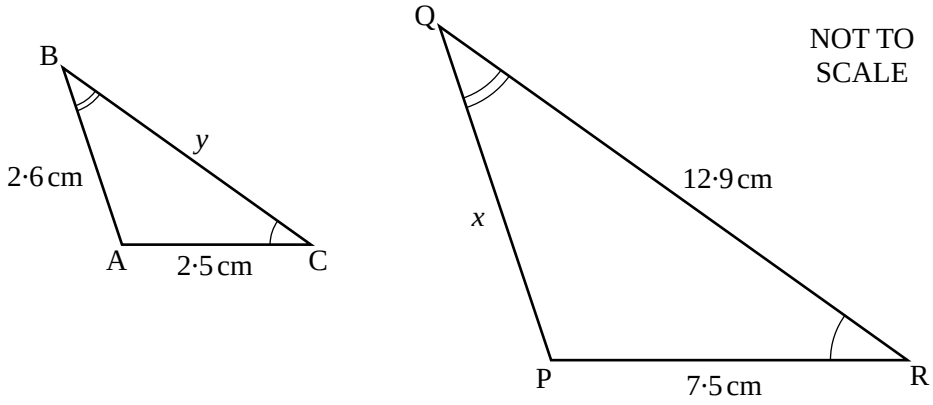
17 ABC and PQR are similar triangles.



Find the length marked

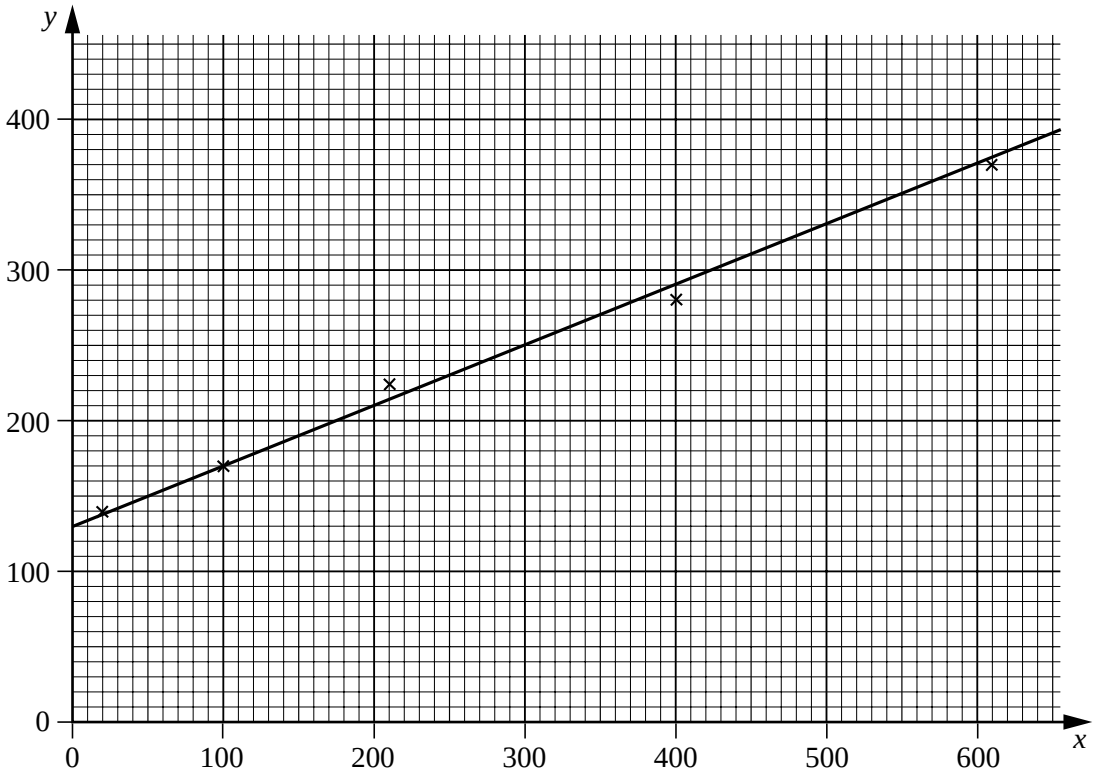
(a) x,

Answer (a) _____ cm **[3]**

(b) y.

Answer (b) _____ cm **[2]**

18 The graph shows the results of a science experiment.
A line of best fit has been put onto the graph.



Find the equation of the line.

Answer _____ **[4]**

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Oxford Cambridge and RSA Examinations

General Certificate of Secondary Education

MATHEMATICS SYLLABUS A

PAPER 3
INTERMEDIATE TIER

1962/3

MARK SCHEME

Specimen Paper 2003

1	**(a)**	**(i)**	16	1	
		(ii)	27	1	
	(b)		3, –3	2	B1 for one correct value
2	Completed design			3	B1 for each correct quadrant
3	**(a)**		15000	2	M1 for $2.5 \times 6 \times 1000$
	(b)		71	6	M1 for 0.05×15000 oe and A1 for 750 and B1 for 14250 and M1 for $\frac{14250}{2000}$ and A1 for 71.(25)
4	**(a)**		0.3	2	M1 for $1 - (0.4 + 0.3)$
	(b)		24	2	M1 for 60×0.4
5	**(a)**		$(1)x + 11y$	2	B1 for one term correct
	(b)	**(i)**	9	3	M1 for $6x - 4 = 50$ and A1 for $6x = 54$
		(ii)	$1\frac{1}{2}$ oe	2	M1 for $4x = 6$
6	**(a)**	**(i)**	Walks back oe	1	
			Has a rest oe	1	
		(ii)	CD	1	
		(iii)	4 km/h	2	M1 for $\frac{8}{2}$
	(b)	**(i)**	$(0)50 \pm 1^{o}$	1	
			12 km ± 1km	1	
		(ii)	Correct Point	2	B1 for angle 260 ± 1^{o} or B1 for distance 7.5 cm ± 0.1 cm

7	**(a)**	450 ml 186 g 3 3/8	1 1 1 1	
	(b)	155.5 or 155.49(9...) 154.5	1 1	Allow either order
	(c)	314 or 310	3	M1 for $3.14... \times 10^2$ oe and A1 for 314. ... or 30^o
8	**(a)**	8 pts correct	2	B1 for 5, 6 or 7 correct
	(b)	Positive	1	
	(c)	Line	1	
	(d)	14 ± 0.3	1	
9	**(a)**	110	2	M1 for $180 - 2 \times 35$
	(b)	145	2	M1 for $180 - 35$
	(c)	90 angle in a semi-circle	1 1	
10	**(a)**	$\frac{11}{15}$	2	M1 for a correct common denominator
	(b)	$\frac{3}{10}$	2	M1 for $\frac{2}{5} \times \frac{3}{4}$ or better
11		Circle, centre *X* Radius 6 cm Circle, centre corner Radius 2 cm	1 1 1 1	
12	**(a)**	(1, 1)	1	
	(b)	Translation $\begin{bmatrix} 4 \\ -6 \end{bmatrix}$	1 1	

13	**(a)**	**(i)**	Evidence of $24 \times \frac{1}{24}$	M1	
			1	B1	
	(b)		No answer	1	Allow ∞
	(c)		No, $-1 \leq$ Answer ≤ 1	2	
	(d)	**(i)**	6×10^4	1	
		(ii)	3.6×10^9	2	B1 for the square of their (i) numerically correct
14	**(a)**	**(i)**	p^7	1	
		(ii)	$4t^3$	1	
	(b)		$x > -5$	2	M1 for $3x > -15$
	(c)		$w = 2s - y$ oe	2	M1 for $2s = w + y$ or $s - \frac{y}{2} = \frac{w}{2}$
15	**(a)**		33, 64, 83, 95, 100	1	
	(b)		6 pts plotted	P2	P1 for 4 or 5 points plotted correctly
			Joined	J1	
	(c)		22.5 to 23.5	1	
	(d)		53 to 55	1	
16			8	5	B1 for $x(x + 3) = 88$ and B1 for $x^2 + 3x - 88 = 0$ and M1 for factors which would give 2 of the 3 terms and M1 for **their** factors equated to 0 and x values found
17	**(a)**		7.8	3	B1 for 3 seen and M1 for 3×2.6
	(b)		4.3	2	M1 for $\frac{12.9}{3}$
18			$y = 0.4x + 130$	4	M1 for correct gradient method and A1 for $m = 0.35$ to 0.45 and B1 for $c = +130$

1662 Analysis Paper 3				Year					Target Grades								AO 1		Notes
Qn	NC ref	Syll ref	Topic/Context	Nu	Man Alg	Non Man Alg	S S	HD	E	D	C	B	M/ S	Co mF/ 1	ComI/ H	Str 1	Str 2	Str 3	
1	2.2b,	2.6a,		2		2			4					4					
2	3.3a,	3.3b					3		3					3					
3	2.1b,	2.1e,	2.1h, 2.1k, 2.3m, 2.3l, 2.4b, 2.4d	8					8				6	8		6			
4	4.1c,	4.4d,	4.4f					4	2	2				4					
5	2.5b,	2.5e			7				2	5				7					
6	2.1e, 3.4b,	2.6c, 3.4d	2.6e			5	4		2 2	3 2				5 4			5		
7	2.3c, 3.1e,	2.3n, 3.4h	2.4b	6			3			4 3	2			4 3			1		
8	4.1a,	4.1f,	4.4l, 4.5f					5		2	3								
9	3.1f,,	3.2c,	3.2d, 3.2h				6		2	2		2						1	
10	2.3c,	2.3d		4						2	2								
11	3.1b,	3.4e					4				4		2		4		4		
12	3.3b,						3				3				3		2		Redundant info
13	,	2.3a	2.3h	8							5	3			8			2	
14	2.5d,	2.5g,	2.5j		6						6				6				
15	4.4a,	4.4e,	4.5b					6				6			6				
16	2.4a,	2.5b,	2.5c		5							5	5		5	5			
17	3.2g						5					5			5				
18	2.1b,	2.1c,	2.1b, 2.6c			4						4			4	4			
21																			
22																			
23																			
24																			
25				28	18	11	28	15	25	25	25	25	13	42	41	15	12	3	