RECOGNISING ACHIEVEMENT

Oxford Cambridge and RSA Examinations

General Certificate of Secondary Education

MATHEMATICS SYLLABUS A

PAPER 4
INTERMEDIATE TIER

1962/4

Specimen Paper 2003

Additional materials: Electronic calculator
Geometric instruments
Tracing paper (optional)

Candidates answer on the question paper.

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 all 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 expected to use a calculator for this paper.

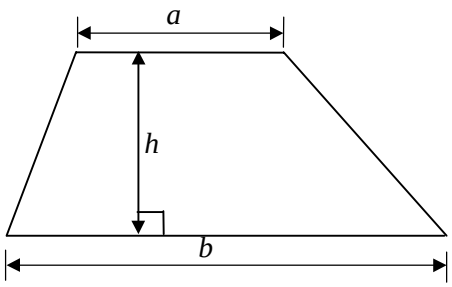
INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- Unless otherwise instructed in the question, take π to be 3.142 or use the π button on your calculator.

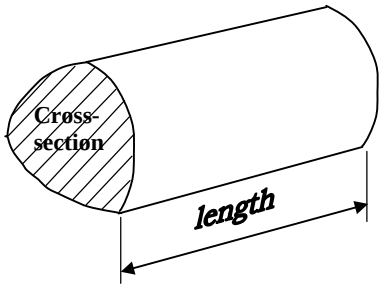
For examiner's use only

FORMULAE SHEET: INTERMEDIATE TIER

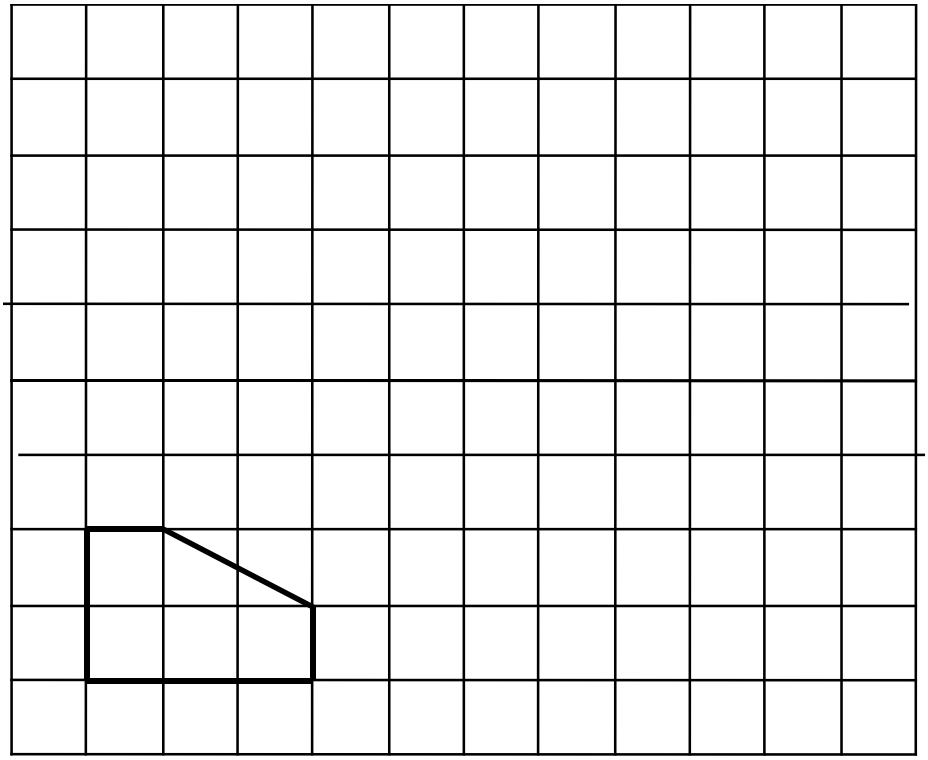
Area of trapezium = $\frac{1}{2}(a + b)h$



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

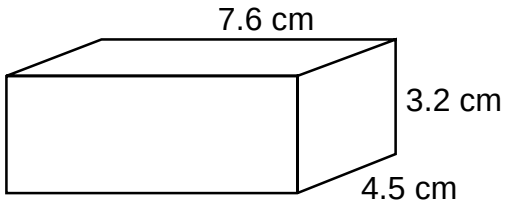


1 **(a)** On the grid, draw an enlargement of this shape. Use a scale factor of 3.



[2]

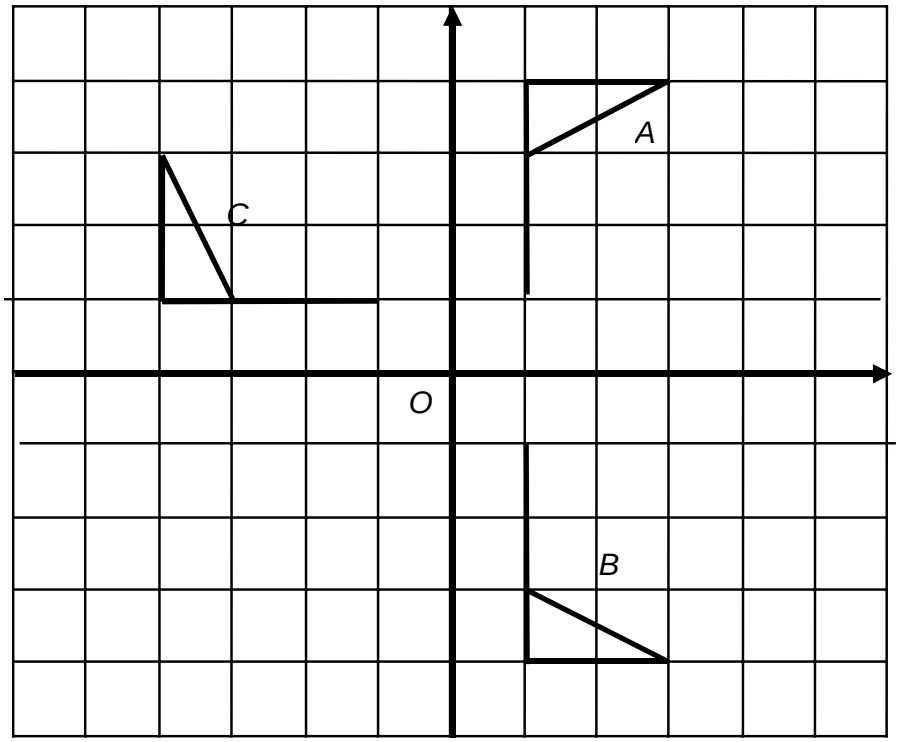
(b) Calculate the volume of this cuboid.



NOT TO SCALE

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

2 **(a)**



(i) Describe fully the single transformation that maps flag *A* onto flag *B*.

_____

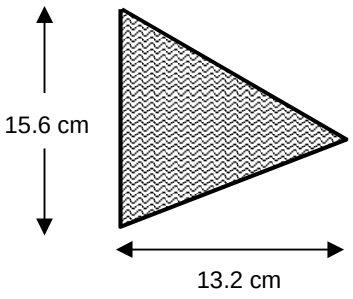
_____ **[2]**

(ii) Describe fully the single transformation that maps flag *A* onto flag *C*.

_____

_____ **[3]**

(b) Calculate the area of this flag.



NOT TO SCALE

_____

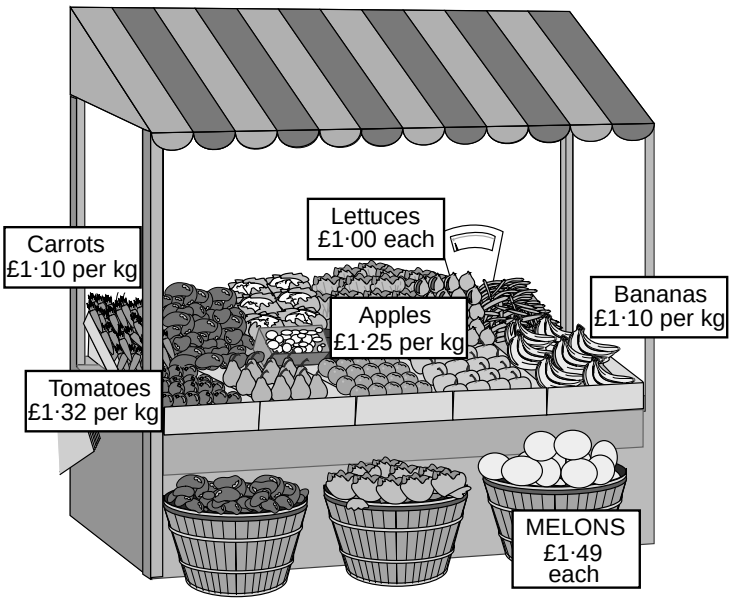
_____

_____

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

PLEASE TURN OVER

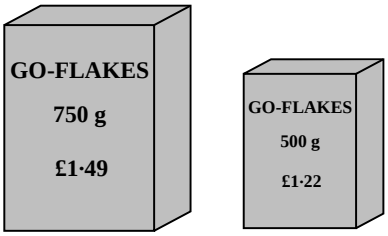
3



(a) Sasha buys 2 melons, 500g of tomatoes and some apples.
She receives £4.11 change from £10.

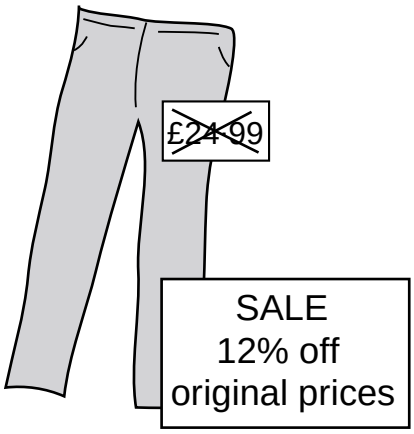
How many kg of apples did she buy? Show the calculations you make.

Answer (a) _____ kg **[4]**



(b) Which of these packs of cereal is better value for money? Show clearly how you decide.

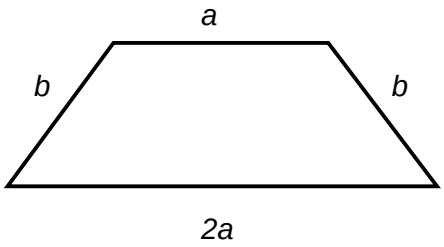
Answer (b) _____ **[2]**



(c) Sasha bought this pair of trousers in a sale. How much did they cost?

Answer (c) £ _____ **[3]**

4 **(a)** Write as simply as possible an expression for the perimeter of this shape.



NOT TO SCALE

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

(b) Solve the equation $2x + 3 = 16$.

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

(c) When $y = 4x + 1$,

(i) find the value of y when $x = -2$,

Answer (c)(i) $y =$ _____ **[1]**

(ii) find the value of x when $y = 19$.

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

5 Calculate the following.

(a) $\sqrt{57.76}$

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

(b) 4.2^4

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

(c) $\dfrac{3.9-0.65}{0.013}$

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

(d) $\dfrac{3.9^2+0.53}{3.9\times0.53}$ Give your answer to the nearest integer.

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

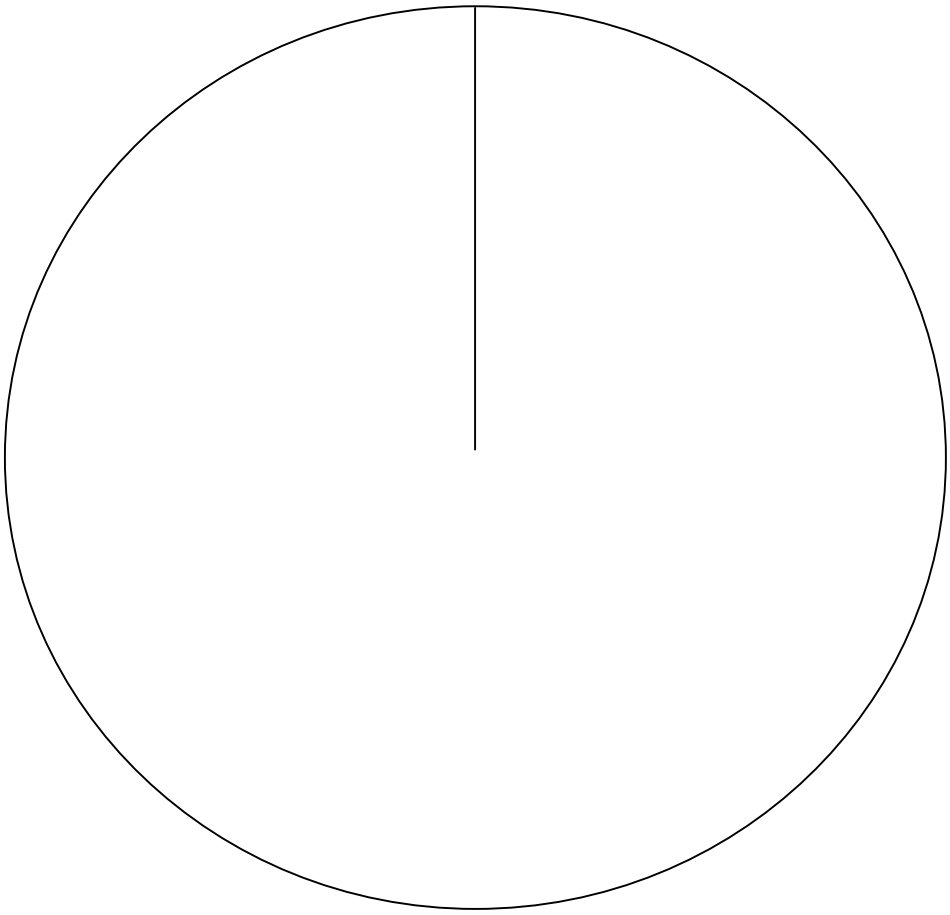
(e) $\sqrt{(3+5\cos 40°)}$

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

6 Pali asked 180 boys what was their favourite sport.
Here are his results.

Sport	Soccer	Rugby	Cricket	Basketball	Other
Number of boys	74	25	18	37	26

(a) Draw a pie chart to show these results.



[3]

Pali also asked 90 girls about their favourite sport.
In a pie chart showing the results, the angle for Tennis was 84°.

(b) How many of these girls said that Tennis was their favourite sport?

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

7 A drink recipe for *Jungle Juice* uses ingredients in the ratio

Orange juice : Lime juice = 3 : 1

(a) How much Lime juice is needed with this recipe if 1.5 litres of Orange juice are used?

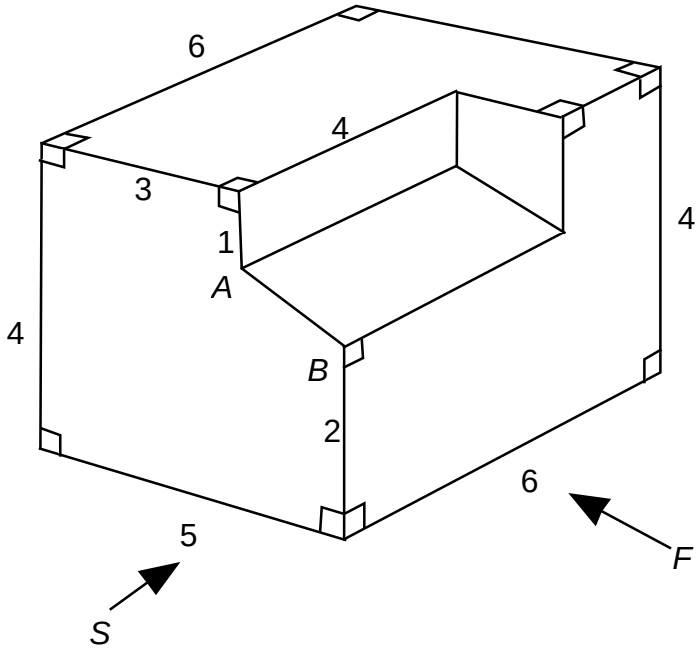
Answer (a) _____ litres **[1]**

(b) How much Orange juice is needed to make 6 litres of *Jungle Juice*?

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

8 The drawing shows a cuboid with a prism removed. The measurements are in centimetres.

NOT TO SCALE



(a) On the grid, draw full size the front (*F*) and side (*S*) elevations.

[4]

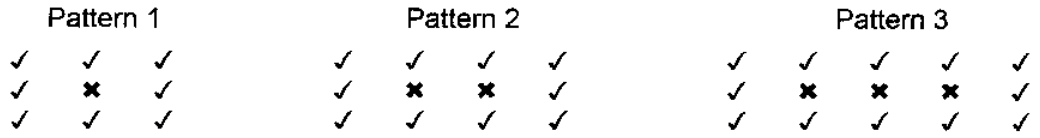
(b) What is the length of the sloping edge marked *AB* on the drawing?

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

9 **(a)** Find the eighth term of the sequence whose nth term is $4n - 1$.

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

(b) The first three patterns in a sequence are shown below.



Write down, in terms of n, the number of ticks when there are n crosses.

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

(c) Here are the first four terms of a sequence.

5 8 13 20

Find the nth term of this sequence.

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

10 The table shows the weight of the luggage for passengers on one plane.

Weight (w kg)	Number of passengers
$0 < w \leq 5$	14
$5 < w \leq 10$	28
$10 < w \leq 15$	12
$15 < w \leq 20$	9
$20 < w \leq 25$	2

(a) What was the modal class?

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

(b) One of the passengers is selected at random.
What is the probability that this passenger's luggage weighs 15 kg or less?

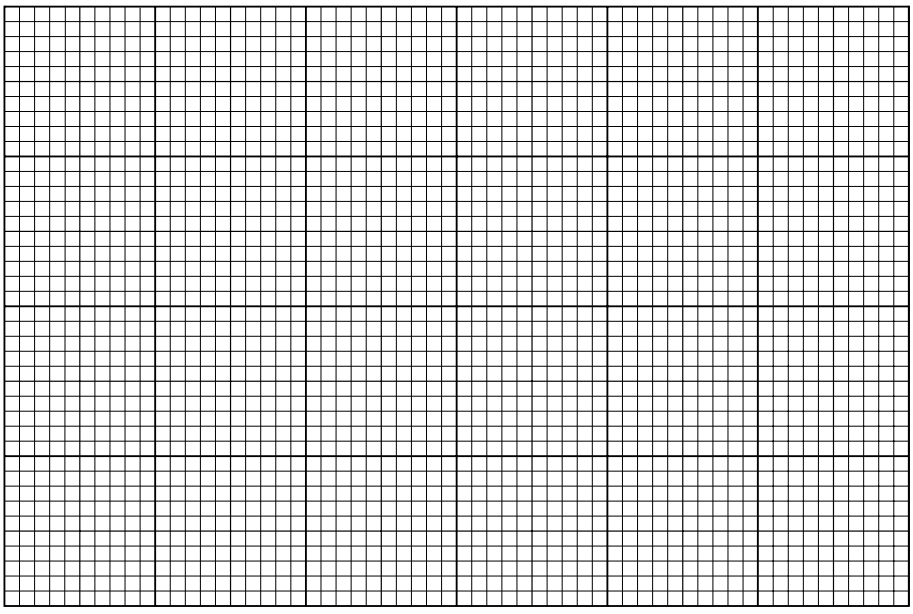
_____

_____

_____

(c) Draw a frequency diagram for this distribution.

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

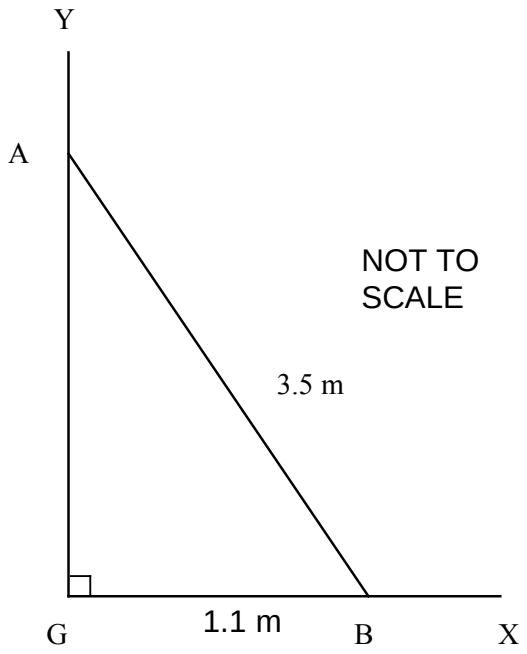


[3]

10 **(d)** Calculate an estimate of the mean weight of luggage for these passengers.

Answer (d) _____ kg **[4]**

11



(a) A tall vertical fence *GY* is supported by a post AB which is 3.5 m long as shown. The foot of the post is 1.1 m from the fence on horizontal ground *XG*.

(i) Calculate the length of *AG*.

Answer (a)(i) _____ m **[3]**

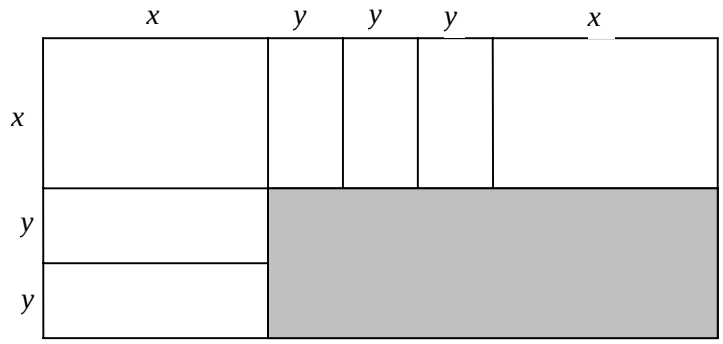
(ii) To be safe, the post must make an angle of at least 70° with the ground. Is this post safe? Show the calculations you make.

Answer (ii) _____ **[3]**

(b) Another post makes an angle of 78° with the ground. Its foot is also 1.1 m from the fence. What is the length of this angled post?

Answer (b) _____ m **[3]**

12 The diagram shows a window formed from rectangular sections.



NOT TO SCALE

(a) Find an expression, without brackets, for the area of the shaded section of the window.

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

The window is 185cm long and 105cm high.

(b) Write down a pair of equations in terms of x and y.

Answer (b) _____

_____ **[1]**

(c) Solve algebraically these simultaneous equations.

Answer (c) $x =$ _____

$y =$ _____ **[3]**

13 Mrs Blake put £3000 in a building society account that offered 6% interest per year.
Interest was added to the account at the end of each year.

How much did she have in her account 3 years later, after the final interest had been added?

Answer £ _____ **[3]**

14 Lake Reindeer in Canada covers an area of 6.3×10^9 m^2.
Lake Michigan in the United States of America covers an area of 5.8×10^{10} m^2.

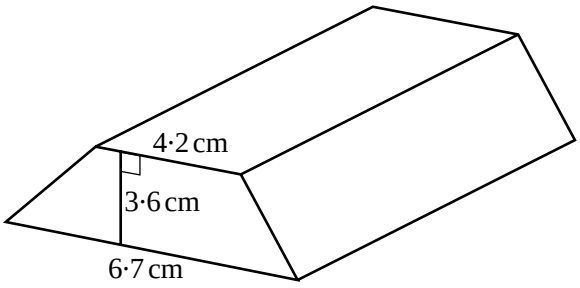
(a) What is the total area covered by these two lakes? Give your answer in standard form.

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

(b) What is the ratio of the area of Lake Reindeer to the area of Lake Michigan?
Give your answer in the form 1:*n*.

Answer (b) 1: _____ **[2]**

15 **(a)** A bar of gold is a prism with volume 165 cm^3. Its cross-section is a trapezium with dimensions as shown.



Calculate the length of the bar of gold.

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

(b) A different bar of gold has a volume given by the formula $V = h^2y$.
Rearrange the formula to make h the subject.

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

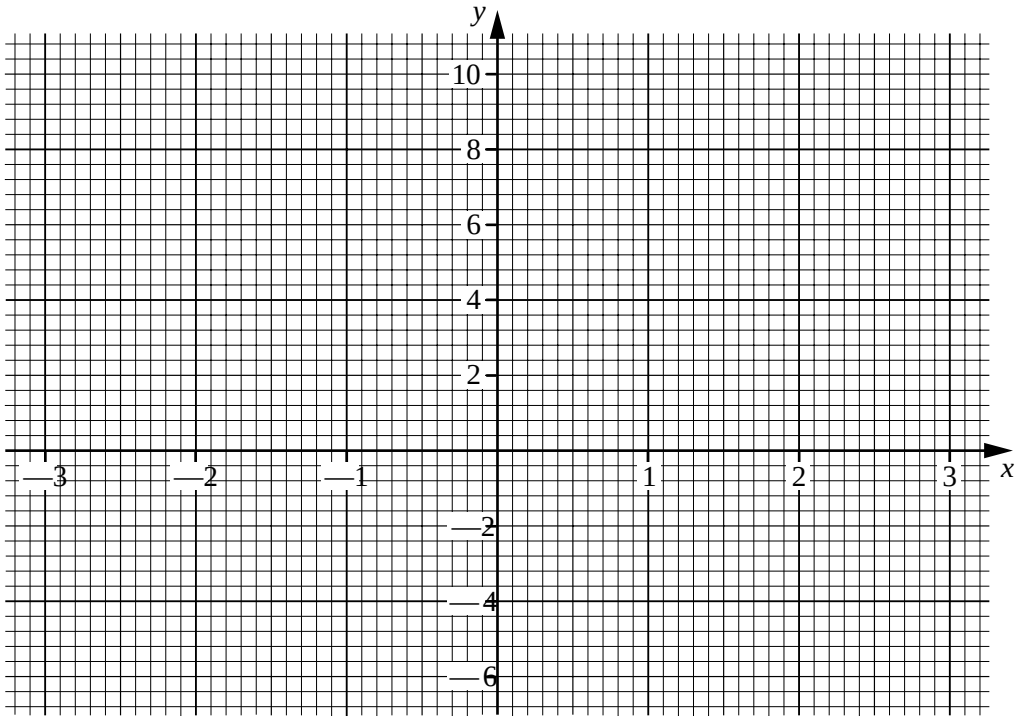
16 Watcham has a population of 86 000 in an area of 104 square miles. To meet housing targets, it needs to aim to house an extra 14 000 people whilst increasing the area by only 6 square miles.

If this happens, by how much will the population density have increased?

Answer _____ people/square mile **[4]**

17 **(a)** Complete this table and draw the graph of $y = x^3 - 7x + 2$ for values of x from -3 to 3.

x	-3	-2	-1	0	1	2	3
y	-4	8				-4	8



[4]

(b) Use trial and improvement to find, correct to 2 decimal places, the solution of $x^3 - 7x + 2 = 0$ which lies between $x = 2$ and $x = 3$. Show clearly your trials and their outcomes.

Answer (b) $x =$ _____ **[4]**

RECOGNISING ACHIEVEMENT

Oxford Cambridge and RSA Examinations

General Certificate of Secondary Education

MATHEMATICS SYLLABUS A

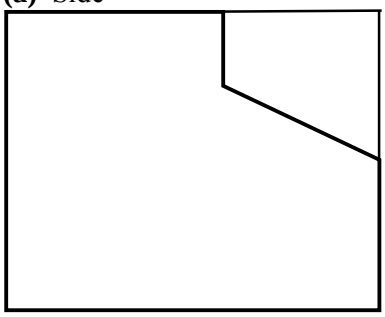
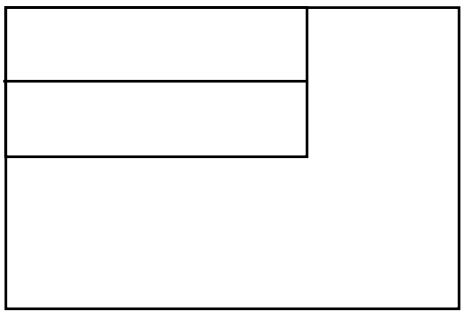
PAPER 4
INTERMEDIATE TIER

1962/4

MARK SCHEME

Specimen Paper 2003

1	**(a)** correct shape enlarged by sf 3	2	B1 for 3 sides correct or for correct shape with wrong sf	
	(b) 109.(44)	2	M1 for 7.6 x 3.2 x 4.5	4
2	**(a) (i)** reflection in x axis	2	M1 for reflection	
	(ii) rotation 90° [anticlockwise] about O, the origin or (0,0)	B1 B1 B1	allow 'turn'	
	(b) 102(.96) or 103	2	M1 for 0.5 x 13.2 x 15.6	7
3	**(a)** 1.8	4	M1 for for $5.89 - 2 \times 1.49 - 0.5 \times 1.32$ A1 for 2.25 M1 for their (2.25) ÷ 1.25	
	(b) 750g cheaper, with evidence	2	M1 for two consistent comparisons eg g per £ for both sizes or price of 1500g etc	
	(c) 21.99 or 22.(00)	3	M1 for 0.12 x 24.99 M2 for 0.88 x 24.99 or finding 12% and subtracting from 24.99	9
4	**(a)** 3a + 2b	2	B1 for one of 2a and 3b	
	(b) 6.5	2	M1 for 2x = 13 or x + 6.5 = 8	
	(c) (i) –7 **(ii)** 4.5	1 2	M1 for 18 = 4x	7
5	**(a)** 7.6	1		
	(b) 311.(1696)	1		
	(c) 250	1		
	(d) 8	2	1 for other rounding / truncations of 7.6149	
	(e) 2.61	1		6

6	**(a)** Angles in degrees 148, 50, 36, 74, 52	1	or %: 41, 13-14, 10, 20-21, 14-15	
	At least 3 sectors drawn correct size [tol. 1°]	1		
	Labels	1		
			M1 for 4° per person or 84/360 x 90	
	(b) 21	2		
				5
7	**(a)** 0.5	1		
	(b) 4.5	2	M1 for $\frac{6}{4}(x3)$	3
8	**(a)** Side 	2	B1 for front face correct or for for shape + back corner with one accuracy error	
	Front 	2	B1 for correct with horiontal line missing, or for correct lines with one accuracy error	
	(b) 2.2 - 2.3	1		5
9	**(a)** 31	1		
	(b) 6n + 6	2	1 for 2n	
	(c) $n^2 + 4$	2	1 for n^2	5

10	**(a)** $5 < w < 10$	1	allow 5-10	
	(b) 54/63 or 0.83(...)	2	1 for attempt at (14+28+12)/no. of passengers	
	(c) bar graph or frequency polygon drawn:			
	axes scaled and labelled	1		
	edges of bars at boundaries of groups or points plotted at midpts of groups	1		
	heights of bars or points correct	1		
	(d) 9.1(9..) or 9.2	4	M1 midpts used M1 sum of mid pts x freq M1 ÷ 65	10
11	**(a) (i)** 3.3(2...)	3	M2 for $\sqrt{(3.5^2 - 1.1^2)}$ or M1 for $1.1^2 + h^2 = 3.5^2$ or better	
	(ii) cos ø = 1.1 / 3.5 or 0.314..	M1		
	inv cos used	M1		
	ø = 71(.6...)	A1		
	or 3.5 x cos 70°	M1		
	= 1.1(97..)	M1		
	so ladder is safe	A1		
	(b) 5.2(9...)	3	M2 for 1.1/cos 78° or M1 for cos 78 = 1.1/length	9
12	**(a)** $6y^2+2xy$	2	M1 for 2y(3y+x) Allow omission of brackets	
	(b) x+2y = 105 x+3y = 185	1		
	(c) x = 55 y =25	3	M1 for multiplying and subtracting oe and A1 for value correct.	7
13	3573.04 or 3573.05	3	M2 for 3000×1.06^3 or M1 for evidence of at least two years totals (3180 and 3370.8(0))	3
14	**(a)** $6.4(3) \times 10^{10}$	2	B1 for correct answer with poor notation	
	(b) 9.2(06..)	2	M1 for $(5.8 \times 10^{10}) \div (6.3 \times 10^9)$	4

15	**(a)** 8.4	3	M1 for Area of trap. = 19.6(2) M1 for 165 / Area of trap	3
	(b) $h = \sqrt{\frac{v}{y}}$	2		2
16	82(.19..)	4	M1 for 86000/104 or 826(.9..) M1 for 100000/110 or 909.(09..) M1 for subtraction of these	4
17	**(a)** 8, 2, –4	1		
	pts plotted	1		
	general shape correct	1		
	smooth curve	1		
	(b) trial 2<x<3	M1		
	trial of 2.4 and 2.5	M1		
	trial of 2.48 and 2.49	M1		
	ans 2.49	1		8

2.1	-3.439		2.41	-0.872479
2.2	-2.752		2.42	-0.767512
2.3	-1.933		2.43	-0.661093
2.4	-0.976		2.44	-0.553216
2.5	0.125		2.45	-0.443875
2.6	1.376		2.46	-0.333064
2.7	2.783		2.47	-0.220777
2.8	4.352		2.48	-0.107008
2.9	6.089		2.49	0.008249

Total 100

1662 Analysis
Paper: 4

Qn	NC ref	Topic	Context	Year: Nu	Man Alg	Non Man Alg	SS	HD	Target grades E	D	C	B	M/S	Com F/I	Com I/H	AO1 Str 1	AO1 Str 2	AO1 Str 3	Notes
1	3.3c 3.4d	Enlargement + find vol of cuboid					4		4					2					paper 2 q 10b only + extra part
2	3.3a 3.4d	Describe tfns + find area of triangle	Flags				7		2	5				7			5		paper 2 q 11
3	2.4a 3.4a 2.3j	Money prob; best buy; % decrease	Shopping	9					6	3			4	9		4		2	paper 2 q 12; (a) is easy E but has kg / g as well as money
4	2.5g 2.5b 2.5e	Simple alg			6	1			5	2				7					paper 2 q 13b,c
5	2.3e 2.3h	Calc effectiveness and efficiency		5					2	1	2			3					paper 2 q 14
6	4.4a 4.5b	Pie chart	Sports					5	5					5					paper 2 q 15
7	3.2i	Plan and elevation					5			5				5			4		paper 2 q 16
9	2.6a	Sequences			5				1		2	2							
10	2.1f 4.4a 4.4e	Modal class + draw freq diag + mean if gped distn + probability	Luggage					10		6	4			4			3		paper 2 q 17a.b + extra parts
8	2.4a	Ratio	Jungle juice	3							3								

11	3.2f 3.2g	Pythagoras + trig	Ladder				9				3	6			6			3	paper 6 q 4 + extra part
12	2.5b 2.5i	Equations etc			6						6				6	2			paper 6 q 5
13	2.3j 2.3k	Compound interest	Savings	3							3				3				paper 6 q 6
14	2.3m 2.3r 2.4a	Standard form	Lakes	4								4			4				paper 6 q 7
15	3.4d 2.5g	Reverse volume	Trap prism		2		3					5			5				paper 6 q 8a
16	2.4a	Compound measures	Popn of Watcham	4								4	4		4	4			paper 6 q 9
17	2.6f 2.5m	Cubic graph + trial and imp				8					4	4			4	2			paper 6 qn 11a + extra part
Totals for paper:				29	19	9	28	15	25	24	26	25	8	42	32	12	12	5	
Totals for tier:																			
Target totals for paper				Nu	Man Alg	Non Man Alg	SS	HD					M/S	Com F/I	Com I/H	Str 1	Str 2	Str 3	
			Fdn	38			28	15	34	22	22	22							
			Inter	28			28	15	25	25	25	25							
			Higher	19			28	15	25	25	25	25							
Target totals for tier																			
			Fdn		n/a									10_13		8	8	8	minimum of 25 AO1 per tier; 8 per strand
			Inter		35-40									15-20		8	8	8	minimum of 25 AO1 per tier; 8 per strand
			Higher		50									20-25		8	8	8	minimum of 25 AO1 per tier; 8 per strand