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This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Markers were instructed to award marks. It does not indicate the details of the discussions that took place at a Markers' meeting before marking began, which would have considered the acceptability of alternative answers.
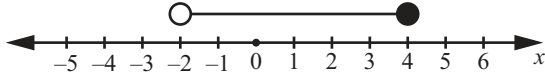
Mark schemes should be read in conjunction with the question paper and the End of Series Report. Cambridge will not enter into discussions about these mark schemes.

Mark scheme annotations and abbreviations

FT	follow through after error
SC	special case mark
cao	correct answer only
isw	ignore subsequent working
nfww	not from wrong working
oe	or equivalent
soi	seen or implied
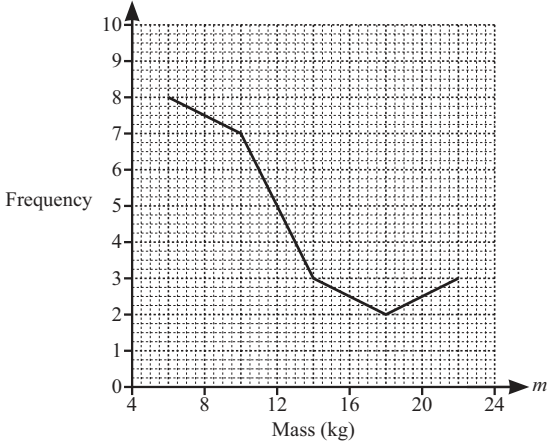
Question	Answer	Marks	Part marks	Guidance
1	$(-5) \leq (n+3) < (17)$	**1**		Both signs in the correct order for the mark.
2	$(w =) 3$	**1**		Do **not** accept $\dfrac{1}{200^3}$

3	$(x =) 10$
	 $(y =) 4$
		2	Award 1 mark for $x = 10$ **or** $y = 4$
			
			 or for correct method to eliminate one variable
			
			 or for *their* two values satisfying one of the original equations.
				Correct method, e.g. multiplying one or both equations by a constant to get equal coefficients and correct consistent addition or subtraction or making x or y the subject and substituting into the other equation.
				 Correct method implied by,
				 e.g. $6x = 60$, $12y = 48$,
				      $5(2 + 2y) + 2y = 58$,
				      $\dfrac{2-x}{-2} = \dfrac{58-5x}{2}$

4	$36(°)$	**1**		
5	$(11 \times 12 -)\ \mathbf{12}\ (\times)\ \mathbf{6}\ (=)\ \mathbf{60}$	**1**		All **three** numbers in the correct order for the mark.
6	☐ ☐ ☑ ☐	**1**		Accept any clear indication.

Question	Answer	Marks	Part marks	Guidance
7(a)	Correct Not correct 	1		Both answers correct for the mark. Accept any clear indication.
7(b)	(gradient =) –3 (y-intercept =) 7	2	Award 1 mark for each correct answer.	Do **not** accept $-3x$ or $-\dfrac{3}{1}$
8	Correct Not correct 	1		Both answers correct for the mark. Accept any clear indication.
9		1		

Question	Answer	Marks	Part marks	Guidance
10	($x =$) 130	4	Award 2 marks for $(360 – 3 × 70) ÷ 3$ or better. **or** Award 1 mark for $360 – 3 × 70$ or better **and** Award 1 mark for $360 – (their\ 50 × 2)\ [÷ 2]$ or better provided ($their\ 50 × 2) < 360$	May be implied by 50 50 may be seen on diagram in correct place. May be implied by 150 Or better, e.g. $360 – 210$ Or better, e.g. • $180 – their\ 50$ provided $their\ 50 < 180$ • if they mark 40° on the diagram for the acute angle in the rhombus then 280 or 140 may imply this mark. *Their* 50 can come from correct working with an arithmetic error **or** can be any angle marked on diagram in place of where 50 should be marked.

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Question	Answer	Marks	Part marks	Guidance
11(a)	Adding only these four values to the correct places in the diagram **Outdoor plants** (0) (1) 7 (2) (3) (7) (7) (3) (4) (5) (8) (9) 9 9 (4) (1) 3	3	Award 1 mark for 17 correct in diagram as the minimum **and** Award 1 mark for *their* highest value in the diagram being 26 more than *their* lowest value, e.g. 17 as lowest and 43 as highest. If 0 scored from these 2 marks, award 1 mark for 43 **or** 17 + 26 oe in the working. **and** Award 1 mark for 39 **and** 39 correctly placed as mode. Maximum 2 marks if more than 4 numbers added to the outdoor plants.	e.g. 15 as lowest value and 41 as highest value. oe, e.g. 43 – 26 = 17 Ignore numbers added to the indoor plants.
11(b)	23 (cm)	1		
12	11	2	Award 1 mark for 81 **or** 110 **or** for correctly evaluating $\dfrac{their\ 110}{10}$	Note cannot be left as a fraction for this mark.
13(a)	6.2×10^{4}	1		
13(b)	0.0081	1		
14	70 (cm^2)	1		

Question	Answer	Marks	Part marks	Guidance
15(a)	Straight lines joining the points (6, 8), (10, 7), (14, 3), (18, 2), (22, 3) 	3	Award 1 mark for **four** plots correct horizontally (m = 6, 10, 14, 18, 22) **and** Award 1 mark for **four** plots correct vertically (frequency = 8, 7, 3, 2, 3).	For 3 marks, ignore lines to the left of mass 6 and to the right of mass 22 for an otherwise correct diagram. Tolerance for points is ±1 small square. Ignore bars when points also plotted, but e.g. bars alone scores 0
15(b)	$8 \le m < 12$	1		Accept any clear indication.
16	0.778 cao	2	Award 1 mark for $0.7\dot{}$ oe seen.	Accept rounded or truncated to 2sf or better for 1 mark.
17(a)	(pattern 5) 24 (pattern 100) 9999	2	Award 1 mark for each correct answer.	
17(b)	$n^2 + 1$ oe	2	Award 1 mark for any quadratic expression.	oe, e.g. $(n^2 - 1) + 2$ scores 2 marks. e.g. $n \times n - 1$ scores 1 mark.

Question	Answer	Marks	Part marks	Guidance
18	Equivalent to 37×10^{-3} Not equivalent to 37×10^{-3} ✓ ☐ ✓ ☐ ☐ ✓ ✓ ☐	2	Award 1 mark for **three** correct ticks.	Accept any clear indication.
19	$A = (0, 44)$ $B = (80, 0)$	2	Award 1 mark for A **or** B coordinates correct **or** $M = (40, 22)$ **or** $A = (80, 0)$ **and** $B = (0, 44)$.	
20	2 **or** 3 **or** 4 **or** 5 **or** 6 **or** 7 **and** 6	2	Award 1 mark for one correct sentence.	
21	A point with negative integer x-coordinate **and** prime y-coordinate **and** satisfy the equation $y = 5 - 2x$, e.g. $(-1, 7)$ $(-3, 11)$, $(-4, 13)$, $(-6, 17)$.	2	Award 1 mark for any coordinates that satisfy $y = 5 - 2x$ **and** one of the other conditions, i.e. for a negative integer x-coordinate on $y = 5 - 2x$, e.g. $(-2, 9)$, $(-5, 15)$ **or** for a prime y-coordinate on $y = 5 - 2x$, e.g. $(0, 5)$, $(1, 3)$, $(1.5, 2)$.	

Question	Answer	Marks	Part marks	Guidance
22	$1\frac{1}{6}$ cao	4	Award 1 mark for $\frac{4}{3}$ oe **or** $\frac{24}{5}$ oe **or** $\frac{5}{24}$ oe seen **and** Award 1 mark for $\frac{4}{3} \times \frac{5}{24}$ **or** $\frac{20}{15} \div \frac{72}{15}$ oe with a common denominator, **FT** $\frac{their\ 4}{3}$ **and** $\frac{their\ 24}{5}$ provided **one** is correct **and** Award 1 mark for correct method to find fractions with a common denominator, e.g. $\frac{16}{18} + their\ \frac{5}{18}$, $\frac{32}{36} + \frac{10}{36}$, $\frac{64}{72} + \frac{20}{72}$ **or** If 2 or 3 marks **not** awarded, award 2 marks for answer $\frac{25}{54}$ oe	First 2 marks implied by $\frac{20}{72}$ oe, e.g. $\frac{10}{36}$, $\frac{5}{18}$ Note this is a method mark, if they show correct working for, e.g. $\frac{20}{15} \div \frac{72}{15}$ with an arithmetic error then award the mark. **FT** for either method for the second mark. *Their* $\frac{5}{18}$ must **not** have a denominator of 9 for this mark. Note this is a method mark, if they show correct working, e.g. $\frac{8 \times 72}{9 \times 72} + \frac{20 \times 9}{72 \times 9}$ with an arithmetic error then award the mark. These 3 marks implied by answers equivalent to $\frac{7}{6}$ e.g. $\frac{21}{18}$, $\frac{42}{36}$, $\frac{84}{72}$ $1\frac{3}{18}$, $1\frac{6}{36}$, $1\frac{12}{72}$ No need to check working if a value equivalent to $\frac{7}{6}$ is given. oe, e.g. $\frac{100}{216}$ isw incorrect cancelling or converting to decimal.

Question	Answer	Marks	Part marks	Guidance
23(a)	3	1		Accept any clear indication.
23(b)	800(%)	2	Award 1 mark for $9x^2$ oe **FT** from **(a)** or better.	1 mark implied by

1 mark implied by

(a)	FT	Or better, e.g. answer
2	$4x^2$	300(%)
4	$16x^2$	1500(%)
200	$40\,000x^2$	$3\,999\,900$(%)
300	$90\,000x^2$	$8\,999\,900$(%)