Question			Answer	Mark	Part Marks and Guidance	
1	(a)		11,13,15,17 or 19	1		Treat extra incorrect values as choice
	(b)		1 and 8	2	**B1** for one correct	Accept $^-1$, $^-8$, $^-27$ etc. Condone 0 Do not accept 1^3 or 2^3 but accept e.g.$2^3 = 8$ Treat extra incorrect values as choice
2	(a)		$(^-4, 3)$	1		
	(b)		Point plotted at $(2, ^-2)$	1		Clear intent
3			Correct reflection	2	**B1** for correct orientation in incorrect position or 3 correct vertices	Correct by eye, accept unruled see overlay
4	(a)		34	1		
	(b)		The numbers are not ordered	1		see appendix
5	(a)		36	2	**M1** for 9×4 or $9 + 9 + 9 + 9$ or $360 \div \left(\frac{90}{9}\right)$	
	(b)		Correct, labelled, 3 sector pie chart	2	**M1** for 180 and 90 or for $\frac{1}{2}$ and $\frac{1}{4}$ or 18 and 9 maybe implied by correct 3 sector pie chart with wrong or missing labels or 4 quadrant pie chart with 2 quadrants labelled draw and 1 quadrant labelled lost	Tolerance $\pm 2^\circ$ by eye, accept good freehand
6	(a)		42	2	**B1** for 6.8 to 7.2 maybe on diagram or **M1** for *their* 7×6	Allow 40.8 to 43.2 *their* 7 between 6.5 and 7.5 or between 68 and 72
	(b)		Point C on a bearing of 285° Point C at a distance of 5.5 cm	1 1		Allow 283 to 287 Allow 5.3 to 5.7

Question			Answer	Mark	Part Marks and Guidance	
7	(a)	(i)	a^7	1		
		(ii)	$20b^3$ as final answer	2	**B1** for $20b^k$ or kb^3 ($k \neq 0$) or correct answer seen and spoilt	
	(b)		30 as final answer	2	**M1** for $6k = 177 + 3$ or better or $k - \frac{3}{6} = \frac{177}{6}$ or better or $6 \times 30 - 3 = 177$ oe	Accept flow diagram
8	(a)		-27	1		
	(b)		14	1		
9	(a)	(i)	30	1		
		(ii)	15 as final answer	2	**B1** for only 3 and 5 [and 1 and / or 15] identified as the common factors	Allow Venn diagram with 5 and 3 in centre Do not allow 15 from 3 + 5 + 7
	(b)		168	2	**M1** for 7×8 [$\times k$] where k is a positive integer, maybe implied by $56k$ or a list of multiples of 7 and 8 reaching 56 or 112 with no errors	Treat extra incorrect values as choice Correct answer from trials scores 2 Lists need not start at 7 or 8 .
10			$\frac{360}{1000}$ 36.8[%] $\frac{7}{19}$ 0.3685	2	**B1** for 3 in the correct order or **M1** for correct conversions of all values to a comparable form e.g 0.3684 0.3685 0.36 0.368	Answers maybe given in correct converted form. Use cover up method

Question			Answer	Mark	Part Marks and Guidance	
11			19	**3**	**M2** for (13 × 4) – (8 + 15 + 10) oe or for 8 + 15 + 10 + 19 = 52 or $\frac{8+15+10+19}{4}$ = 13 or **M1** for 13 × 4 maybe implied by 52 or for $\frac{8+15+10+x}{4} = 13$ or better or for $\frac{8+15+10+c}{4}$ correctly evaluated for their value of *c*	Correct final answer by trials scores 3
12	**(a)**		99	**2**	**B1** for 8 + 6.5 × 14	
	(b)		13	**2**	**M1** for 2 × 39 = 6*q* or better or for 39 ÷ 6 = $\frac{1}{2}q$ or better or for 39 ÷ 3 or $\frac{1}{2}$ × 6 × 13 = 39	Do not accept embedded answer for 2 marks
13	**(a)**		150 120 89 and 73	**2** **1** **1**	**M1** for $\frac{5}{9}$ × 270 **FT** 270 – *their* 150 **FT** *their* 150 – 61 and *their* 120 – 47	If they start with $\frac{4}{9}$ × 270 apply scheme to their values Values must be positive

Question			Answer	Mark	Part Marks and Guidance	
	(b)		61 + 47 = 108 AND $\frac{108}{270} \times 100 = 40$[%] or $\frac{108}{270} = 0.4 = 40$[%] or $270 \times 0.4 = 108$ oe	**1** **1**		Breakdown methods must be complete, correct and contain a calculation Do not accept e.g. 0.4 of 270 = 108 or 40% of 270 = 108 (calculation not seen) Do not accept e.g. 40**%** × 270 Working may be seen next to diagram

Question			Answer	Mark	Part Marks and Guidance	
14			30 with correct working	**5**		Correct working requires evidence of correct consistent units and 7
					B2 for 7 or **B1** for $\frac{10}{1.3}$ oe or repeated addition or subtraction reaching 9.1 or 0.9 AND	**B2** or **B1** maybe implied from use in subsequent working Award **B** marks even if not used to find final answer and not contradicted.
					M2 for $\frac{their(\frac{10}{1.3})\times 1.5}{0.35}$ or $\frac{their(\frac{10}{1.3})\times 1500}{350}$ or $\frac{10500}{350}$ or $\frac{10.5}{0.35}$ or	*their* $\frac{10}{1.3}$ maybe implied by 7.69 to 7.7 or 8
					M1 for $\frac{their(\frac{10}{1.3})\times \text{figs}15}{\text{figs}35}$ or $\frac{figs105}{figs35}$ or $\frac{1500}{350}$ or $\frac{1.5}{0.35}$	Award **M** marks even if not used to find final answer and not contradicted.
					If **0** or **1** scored, instead award **SC2** for answer 30 with no or insufficient working If **0** scored, instead award **SC1** for answer figs 3 with no or insufficient working	

Question			Answer	Mark	Part Marks and Guidance	
15			A E	**2**	**B1** for each	Accept the full correct equation
16			$x \geq 3$ or $3 \leq x$	**2**	**B1** for $x > 3$ or $3 < x$ or $x \leq 3$ or $3 \geq x$	
17	**(a)**		$\begin{pmatrix}-3\\-4\end{pmatrix}$	**2**	**B1** for $\begin{pmatrix}-3\\j\end{pmatrix}$ or $\begin{pmatrix}k\\-4\end{pmatrix}$	Penalise one mark for use of vinculum on first occurrence of a mark being awarded.
	(b)		$\begin{pmatrix}5\\3\end{pmatrix}$	**1**		
	(c)		$\begin{pmatrix}6\\12\end{pmatrix}$	**1**		
18			51.3	**2**	**B1** for 51.2[5] or $\frac{205}{4}$ or $51\frac{1}{4}$ If **0** scored **SC1** for *their* answer to more than 3 figures correctly rounded to 3 s.f.	
19			25	**2**	**B1** for 40 : 1000 oe or $\frac{1000}{40}$ oe or 0.025 as the answer or answer with units e.g. 25 with any unit, 1 : 25 with consistent units	oe e.g 0.04 : 1 condone as answer 1 : 25 for 1 mark **B1** for e.g. 25g, 25kg or 1kg : 25kg
20	**(a)**		6	**1**		
	(b)		-1	**1**		
21	**(a)**		negative no correlation positive	**2**	**B1** for 2 correct	accept none, neutral, zero or uncorrelated for no correlation ignore embellishments

Question			Answer	Mark	Part Marks and Guidance	
	(b)		acceptable ruled line of best fit FT *their* straight line, reading from 250	**B1** **B1FT**		See overlay between (170, 10) and (170, 50) and between (380, 160) and (380, 200) and must reach the vertical lines, ignore beyond overlay No line drawn 0 marks Line must have positive gradient. Correct reading ± 2 and *their* reading should be within the same grid square where *their* line(lobf) crosses 250

Question			Answer	Mark	Part Marks and Guidance	
22			4.2	**4**	**B3** for 0.042 OR **M2** for $\frac{10352-8000}{7}$ maybe implied by 336 oe or $\frac{10352-8000}{7000}$ maybe implied by 0.336 oe or $\frac{10352-8000}{8000}$ maybe implied by 0.294 or 29.4 or $\frac{8000\times r\times 7}{100}$ = 10352 – 8000 or better OR **M1** for 10352 – 8000 maybe implied by 2352 or $\frac{10352}{8000}$ maybe implied by 1.294 or 129.4 or $\frac{8000\times r\times 7}{100}$ AND **M1** for *their* 336 ÷ 8000 or *their* 0.336 ÷ 8 or 0.294 ÷7 or 29.4 ÷ 7 or $\frac{2352}{560}$	Condone % sign for 4 marks or B3

Question			Answer	Mark	Part Marks and Guidance	
23	**(a)**		Equation Identity Equation	**1**		
	(b)		$y = 3x + 5$ as final answer	**3**	**B2** for final answer $3x + 5$ or for a correct equation but not in required form isw OR **M2** for using (2, 11) correctly in $y = 3x + c$ oe or **M1** for "y = 3x + c" or for y = $3x + k$ oe where k is any numerical value except 0 or 5 or for correctly substituting (2, 11) in $y = mx + c$ oe ($m \neq 3$)	**B2** for e.g. $(y - 11) = 3(x - 2)$ or $y - 3x = 5$ or $3x - y + 5 = 0$ as the answer **B2** for $y = 3x + 5$ seen in working and subsequently spoilt (excluding changing to a perpendicular gradient) e.g. $11 = 3 \times 2 + c$ e.g. $11 = \frac{1}{3} \times 2 + c$
24			57.9 to 58.03..	**3**	**M2** for $\tan^{-1} \frac{7.2}{4.5}$ or **M1** for $\tan [x] [=] \frac{7.2}{4.5}$ or $\tan [x] [=] 1.6$ oe	For **M2** do not accept shift for $\tan^{-1}$ Accept full methods using Pythagoras with sin or cos Don't penalise If a different letter to x is used

Question			Answer	Mark	Part Marks and Guidance	
25			Three correct and different criticisms or suggestions for improvement	**3**	We need three statements, only one from each category (in guidance) for 3 marks. **B2** for two correct or **B1** for one correct Different means different category Note : the same criticism and suggestion e.g. standing by station will only get people using trains and they should stand in the middle of town is only 1 mark	Categories: • Larger sample size • Vary the time (hour or day) • Vary the location e.g biased towards railway users • No control over numbers of genders • No control over numbers in age groups see appendix for exemplars and treat stratified sample as one category (usually age or gender)
26			140	**4**	**M3** for 483 ÷ (4 + 20 + 45) × 20 oe accept 483 ÷ (*m* + 20 + 45) × 20 or 483 ÷ (4 + 20 + *n*) × 20 or **M2** for 483 ÷ (4 + 20 + 45) oe accept 483 ÷ (*m* + 20 + 45) or 483 ÷ (4 + 20 + *n*) or **M1** for 4 : 20 or 20 : 45 or 69	Accept consistent equivalent ratios of the form 4*k* : 20*k* or 20*k* : 45*k* where *k* is a positive integer Ignore additional third part of the ratio
27			16 hours 48 minutes	**4**	**B3** for 16.8 or 1008 or **M2** for 7 × 36 ÷ 15 [× 60] oe or **M1** for 7 × 36 maybe implied by 252 or 15 ÷ 7 maybe implied by 2.14.. or 7 ÷ 15 maybe implied by 0.46..	

28			62.16 to 62.18 or 62.2 with correct working or $4\sqrt{34}$ + 6π + 20 oe with correct working	**6**	**M2** for $\sqrt{20^2 + 12^2}$ or **M1** for $20^2 + 12^2$ maybe implied by 544 **A1** for 23.3… or $4\sqrt{34}$ or $\sqrt{544}$ oe with correct working AND **M2** for $\frac{12\pi}{2}$ maybe implied by 6π or by 18.84 to 18.852 or **M1** for 12π maybe implied by 37.68 to 37.704 If **0,1 or 2** scored, instead award **SC3** for answer 62.16 to 62.18 or 62.2 or $4\sqrt{34}$ + 6π + 20 or $\sqrt{544}$ + 6π + 20 with no working or insufficient working If **0 or 1** scored, instead award **SC2** for answer 42.16 to 42.18 or 42.2 or $4\sqrt{34}$ + 6π or $\sqrt{544}$ + 6π with no working or insufficient working If **0** scored, instead award **SC1** for 23.3… or $4\sqrt{34}$ or $\sqrt{544}$ or 43.3… or $4\sqrt{34}$ + 20 or $\sqrt{544}$ + 20 with no working or insufficient working	Correct working requires at least the first **M1 AND** the second **M1** Award **M** and **A** marks even if not used to find final answer and not contradicted Award **M2 A1** if **M1A1** seen Award **M** marks even if not used to find final answer and not contradicted Their 12π must not come from area calculation or from 2 x π x 12 ÷ 2 Could be in working eg 23.3 + 6π

Question			Answer	Mark	Part Marks and Guidance	
29	**(a)**		3.7×10^{-3}	**1**		Condone trailing zeros
	(b)		20 or 2×10^{1} or 2×10 nfww	**4**	**M1** for $1.2 \times 10^{6} + 4[.0] \times 10^{6}$ or 5.2×10^{6} oe **M1** for $1.5 \times 10^{5} + 1.1 \times 10^{5}$ or 2.6×10^{5} oe **M1** for $\frac{a\ population\ value}{an\ area\ value}$	may be implied by figs 52 may be implied by figs 26 Award **M** marks even if not used to find final answer as long as it is not contradicted. Population and area values must be consistent eg both south island, both north island or *their* summed population and area e.g. **M1** implied by 8 or 36.36 to 36.4 or 44.36 or 44.4