Question			Answer	Marks	Part marks and guidance	
1	(a)		tangent	1		Ignore spelling providing intention is clear
	(b)		segment	1		Ignore spelling providing intention is clear
2	(a)	(i)	13	1		Ignore subsequent terms
		(ii)	128	1		Ignore subsequent terms
	(b)		$18 - 3n$ **oe**	2	**M1** for $-3n + k$ oe or for $mn + 18$ **oe** ($m \neq 0$)	For 2 or M1, condone eg $n = 18 - 3n$ For 2 or M1, condone use of *other* variable instead of n
3			122 with justification showing 121 or $11^2 + 1$ and 125 or $5^3 - 3$	4	**B3** for answer 122 OR **M1** for at least 5 square numbers (or 5 square numbers + 1) **isw** **M1** for at least 3 cube numbers (or 3 cube numbers – 3) **isw** **M1** for reducing their list to non-primes If 0 scored, **SC1** for answer 5 or 17 or 37 or 61 or 101	 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144 2, 5, 10, 17, 26, 37, 50, 65, 82, 101, 122, 145 1, 8, 27, 64, 125 5, 24, 61, 122 Implied by any non-prime answer less than 150
4	(a)		$(x - 43)(x + 43)$ final answer	1		Condone omission of final bracket
	(b)		1400	2	**M1** for $(57 + 43)(57 - 43)$ FT *their* quadratic factors in (a) or better or **B1** for 3249 or 1849 **seen**	M1 for FT factors $(x + 43)(x + 43)$ or $(x - 43)(x - 43)$ only

Question			Answer	Marks	Part marks and guidance	
5	(a)		Image at (1, –3), (3, –3), (1, –6)	2	**B1** for reflection in any horizontal line or for reflection in $x = -1$	Use overlay mark intention isw other shapes
	(b)		Enlargement [sf] ½ oe [centre] (5, 7)	3	**B1** for each	More than one transformation given spoils all 3 marks Extra properties treat as choice
	(c)		–1 and (0, 0)	2	**B1** for either	Accept origin for (0, 0)
6			120	5	**B3** for $x = 5$ OR **M1** for $x + 3 + x + 3 + 4x - 5 + 4x - 5$ [= 46] **oe** **M1** for $10x = 46 + 4$ FT *their* linear eqn **M1** for $50 \div 10$ FT *their* $ax = b$ **M1** for $(4 \times$ *their* $x - 5) \times ($*their* $x + 3)$	$10x - 4$ [= 46] oe eg $x + 3 + 4x - 5 = 23$
7			308	5	**M4** for $252 \div 0.9 \times 1.1$ **oe** OR **M1** for $252 \div 0.9$ **oe** **A1** for 280 **M1** for *their* 280×1.1 **oe** **A1FT** for *their* 280×1.1 rot to nearest pound or better	
8	(a)		$180 \div (1 + 2 + 3) \times 3$ [= 90]	2	**M1** for $180 \div (1 + 2 + 3)$ If 0 scored, **SC1** for angles 30, 60, 90	Condone 6 for 1 + 2 + 3
	(b)		7.5	4	**B1** for $\sin 30° = \cos 60° = ½$ **soi** **M2** for $15 \sin 30$ **oe** or **M1** for $x/15 = \sin 30$ **oe**	

Question			Answer	Marks	Part marks and guidance	
9			80	**4**	**M3** for 250 ÷ (8*k* +10*k* + 7*k*) × 8*k* **oe** or **M2** for 250 ÷ (8*k* +10*k* + 7*k*) **oe** or **M1** for two ratios with a common number of women implied by 8*k* (men) **and** 7*k* (children) seen, *k* > 0 or for 8 : 10 [:7] or [4:] 5 : 3.5 seen	M3 implied by 80 , 100, 70 with 80 not selected e.g. 0.8 and 0.7, 4 and 3.5
10			AD = AB [given] **oe** CD = CB [given] **oe** AC = AC (common) **oe** Congruent SSS Angle ADC = angle ABC	**M3** **A1**	**M2** for 2 correct statements with reason[s] or 3 correct but no/incorrect reason[s] **M1** for 1 correct statement with reason or 2 correct but no/incorrect reasons If 0 scored, **SC1** for AC is a line of symmetry **oe** or for triangle ADC is congruent to triangle ABC **oe**	Accept vertical line of symmetry or reflection see diagram as well if unsure
11	**(a)**	**(i)**	16 000	**1**		
		(ii)	25	**1**		
		(iii)	16 000 × 0.75^2 **oe** with no subsequent error	**M2**	**M1** for 16 000 × 0.75^2 with subsequent error or 16 000 × 0.75 **oe** or for *their* 12 000 × 0.75	M1 implied by 12000
	(b)		Equation does not give a straight line **oe isw**	**1**		Accept 'There is not a constant decrease' oe isw See AG

Question			Answer	Marks	Part marks and guidance	
	(c)		If you calculate a value for a 20 year-old car it is greater than 0 **oe**	**1**		Accept 'the graph will never reach the *x*-axis' oe, It will have scrap value The answer is always positive etc Condone additional 'opinion based' information
12	**(a)**		$0.8\dot{3}$	**2**	**M1** for division attempt leading to 0.8.....	Accept 0.833[3]…..
	(b)		$\frac{19}{150}$ as final answer	**3**	**B2** for $\frac{114k}{900k}$ **oe** or **M1** for 126.66... and 12.66... or better or fraction $\frac{k}{900}$ or $\frac{k}{9900}$ **seen**	Sets up a 'pair' to eliminate the recurrence Accept eg 12.666.. and 0.126…
13	**(a)**		27	**2**	**M1** for 1350 ÷ 50 If 0 scored **SC1** for answer figs 27	
	(b)		30	**5**	**B1** for 1350 **M3** for 1350 = 40*k* + ½ ×10×*k* **oe** or **M2** for 40*k* + ½ ×10×*k* **oe** or **M1** for any attempt to find any relevant area under the graph	Condone figs 135 for M3 and variable other than *k*
	(c)	**(i)**	–3	**1FT**	FT (–*their* (b) ÷ 10)	
		(ii)	[Constant] deceleration **oe** m/s^2	**1** **1**		Condone acceleration The rate at which the speed changes

Question			Answer	Marks	Part marks and guidance	
14	(a)		It should have been $\frac{5}{10}\times\frac{4}{9}$ **oe isw**	2	**M1** for showing $\frac{5}{10}\times\frac{5}{10}$ or $\frac{1}{2}\times\frac{1}{2}$ or for explaining that he did not take account that there was one less sweet for the second choice **oe**	
	(b)		$\frac{58}{90}$ **oe**	4	**M3** for $\left(\frac{5}{10}\times\frac{5}{9}\right)+\left(\frac{4}{10}\times\frac{6}{9}\right)+\left(\frac{1}{10}\times\left[\frac{9}{9}\right]\right)$ **oe** or **M2** for the sum of any 2 of the above products **oe isw** or **M1** for any correct product from above **oe isw** If 0 scored, **SC1** for 58 different options **soi**	oe $2\left(\frac{5}{10}\times\frac{4}{9}\right)+2\left(\frac{4}{10}\times\frac{1}{9}\right)+2\left(\frac{5}{10}\times\frac{1}{9}\right)$ or $1-\left(\frac{5}{10}\times\frac{4}{9}\right)-\left(\frac{4}{10}\times\frac{3}{9}\right)$ accept equivalents over 90 throughout for method and grouping of products or M2 for the sum of any 4 of the above products oe isw or M1 for any the sum of any 2 of the above products oe isw Implied by $\frac{58}{100}$
15	(a)	(i)	90	1		
		(ii)	22	2	**M1** for [UQ =]100 or [LQ =] 77 to 79	Accept 21 to 23

Question			Answer	Marks	Part marks and guidance	
	(b)		No with 18 to 20 and 30 OR No with 8% to 10% [and 15%] OR No with [£] 110 to112 [which is less than 120] OR No with 170 and 180 to 184	**2**	**M1** for 18 to 20 or 8% to 10% or 110 to 112 or for 30 or 170 or 180 to 184	Could be written on graph for M1
	(c)		Families in the south spent less on average as their median was lower **oe**	**2**	**Strict FT** their median in (a)(i) **M1** for Families in the South spent less **oe nfww**	Allow either way around but do not allow M1 if wrong reason given e.g. in first reason mentions IQR for spending less Ignore ref to figures
			Families in the south were more spread in their spending as their IQR was larger **oe**	**2**	**Strict FT** their IQR in (a)(ii) **M1** for Spending varies more in the South **oe nfww**	For M1 allow spread oe associated with IQR without comparison
16	**(a)**		$7\sqrt{3}$	**3**	**M2** for $2\sqrt{3}$ and $5\sqrt{3}$ or **M1** for $\sqrt{4\times3}$ or better or $\sqrt{25\times3}$ or better	
	(b)		$\frac{1}{8}$ **oe** final answer	**3**	**M1** for fourth root **soi** **M1** for cube **soi** **M1** for reciprocal **soi**	Each step must be correctly evaluated but FT previous step Allow method marks in any order 2 implies M1, ½ implies M1M0M1 8 implies M1M1M0, 4096 implies M0M1M0

Question			Answer	Marks	Part marks and guidance	
17			$-1 \leq x \leq 6$ oe	4	**M2** for $(x - 6)(x + 1)$ [≤ 0] **oe** Or **M1** for $(x + a)(x + b)$ [≤ 0] where $ab = -6$ or $a + b = -5$ **B1** for –1 and 6 **soi**	For M2 or M1, condone [= 0] M2 for correct formula or complete square condone 1 error M1 for $(x - 2.5)^2$ oe seen or for correct formula with 2 errors Could be seen as roots on sketch of graph or in wrong inequality
18			$(x + 1)^2 - x^2$ **oe** Expands all brackets correctly for their expression eg $x^2 + 2x + 1 - x^2$ $2x + 1$ is always odd **oe**	M2 M1 A1	**M1** for x and $x + 1$ shown **oe** With no errors seen and brackets expanded for their expressions If 0 scored, **SC1** for 2 correct numeric examples or correct reasoning with consecutive odds and evens	For M2 or M1 Condone any two consecutive expressions written algebraically and condone reversal If reversed then brackets needed or all signs need to be correct Condone $-2x - 1$ for reversal FT from *their* correct consecutive square expressions eg square numbers 1, 4, 9, 16, go odd, even, odd etc, odd – even = odd, even – odd = odd

Question			Answer	Marks	Part marks and guidance	
19			$x = ½$ **oe** $y = 1$ $x = 5$ y = 19 **nfww**	6	**M1** for $2x^2 - 7x + 4 = 4x - 1$ **oe** **M1** for $2x^2 - 11x + 5$ [= 0] **oe** 3 term eqn **M2** for $(2x - 1)(x - 5)$ [= 0] or **M1** for $(2x + a)(x + b)$ [= 0] where $ab = 5$ or $2b + a = -11$ **A1** for $x = ½$ **oe** and $x = 5$	Implies previous M1 FT *their* 3 term quadratic equation M2 for complete the square or for formula condone 1 error M1 for $\left(x - \frac{11}{4}\right)^2$ oe or for correct formula used with 2 errors