Question			Answer	Marks	Part Marks and Guidance	
1	**(a)**		26	2	**M1** for 20 × 0.7 + 30 × 0.4 or for 14 found	[mark for whole bars found in next part]
	(b)		Frequencies in each group soi: [6, 28], 40, 64, 38, 21, 12	M1	Allow this **M1** for four or more correct	
			Sum of frequencies attempted	M1	209 if correct	
			Frequencies × midpoints attempted: 6 × 5, 28 × 20, 40 × 40, 64 × 60, 38 × 80, 21 × 105, 12 × 135	M1	At least 3 correct or FT correct: may be 30, 560, 1600, 3840, 3040, 2205, 1620 [total = 12 895]	Allow 5, 5.005, 5.5(0) as midpoint for first group and similarly for others
			Their total of midpoints × freq ÷ *their* sum of frequencies	M1	May be implied by correct answer or by FT answer if *their* total seen; total of frequencies = 209 if correct	Allow FT from endpoints used for midpoints for this last **M1**
			61.69 to 61.70 or 62	A1	nfww	

2	**(a)**		7	1		
	(b)		17.5 with correct working	2	**B1** for correct answer with no working Or **M1** for 3, 6, 2, [3], or [3], 7, 4 found, condoning one error or for attempt to locate 13th value or for eg attempt to 'cancel' equal areas from each end	For **2** marks, must show at least the working which would gain an **M1**

3			Frequency densities 1, 1.6, 2, 2.2, 1.6, 0.2 soi Heights correct Widths correct Sensible scale and fd axis labelled	B1 B1 B1 B1	Seen or plotted Condone one error No FT from wrong freq density Accept 'Frequency density' or 'Fd' and/or 'people per £10k' oe	 **0** if labelled 'Freq' oe

4	**(a)**	Freq densities: 0.1. 0.3, 0.2, 0.28, 0.01 Bars all correct height Bars all correct width	**1** **1** **1**	Seen or plotted; condone one error No FT from wrong freq density	May be by table Use overlay Condone unruled and without vertical lines to bars
	(b)	(i) It is in the 200-250 group	**1**	Condone poor notation, as here	Both 200 and 250 must be mentioned; Ignore reference to number of recipes
		(ii) 9	**1**		

5	**(a**	Frequencies in each group soi: [5], 10, 17, 33, 35 Correct boundaries to groups Frequencies × midpoints attempted: 5 × 25, 10 × 75, 17 × 150, 33 × 350, 35 × 750 *Their* total of midpoints × freq ÷ 100 412.25 [so over 400 h]	**M1** **M1** **M1** **M1** **A1**	Allow this **M1** for two or more correct Condone poor notation such as 200-500, 500-1000 if endpoints correct At least 3 correct or FT correct: may be 125, 750, 2550, 11550, 26250 [total = 41 225] May be implied by correct answer or by FT answer if *their* total seen Or allow final **M1 A1** for comparison of 41225 with 400 × 100	 Condone 24.5, 74.5, 149.5 etc No FT from endpoints used
	(b)	Estimate of mean uses midpoints, but actual values may have been towards lower end of groups oe	**1**		Comment should indicate values might have been towards low end of groups, not just that they are grouped and we do not know actual values

6	(a)		Frequency densities 0.12, 0.2, 0.18, 0.17[2], 0.13[2], 0.02 soi Heights correct Widths correct	**1** **1** **1**	Seen or plotted Condone one error No FT from wrong frequency density 0 for widths mark if polygon drawn as well	 accept plotting within square for 0.17 to 0.172, and similarly for 0.13 to 0.132 for 100, 300, 500, 1500 condone vertical up to half a square out
	(b)		54	**1**		
	(c)		the groups go up to 2000+1200 = 3200 max, but the person who spent most can spend less than this	**1**	or 'they may not have been the top person in each category but spent most overall' bod 'they' as being the person who spent most	Condone omission of being the person who spent most if valid spending itemised e.g. 2000 + 1100 [= 3100]; must reference 3200 (or 2000 and 1200) or reference both 1500 - 2000 and 900 – 1200 See appendix for exemplar comments

7	**(a)**		Fds 0.4, 0.7, 1.25, 0.8, 0.36	1	At least 3 correct; may be implied by heights of bars	
			Bars of correct height	1	Tolerance 1 mm unless on gridlines	FT their scale;
			Bars of correct width	1	Must have no bar 0-10	Ignore additional polygons
			Vertical axis with consistent linear scale and labelled 'Frequency density' oe	1	**B0** for scale of 0-40 etc for frequency graph even if labelled frequency density	Accept abbreviations;
	(b)	**(i)**	3	1		
		(ii)	It was between 0 and 2 hours	1	Accept 'it was less than 2 hours' or 'it was 2 hours or less' or 'from 0 to 1.99 h' or better	0 for comment only about number of people cycling shortest time; must refer to the time See appendix for more exemplars

8			Frequency densities: 3, 4, 5, 1, 0.4	1	Seen or used as heights; condone two errors	May be by table
			Bars all correct height	1		
			Bars all correct width	1		

9	(a)		Freq densities: 3.5, 6, 9, 13.5, 2.5 Bars all correct height Bars all correct width	1 1 1	Seen or plotted; condone one error No FT from wrong freq density Last mark may be earned for bars without tops	eg allow if points plotted at correct heights Use overlay Condone unruled and without vertical lines to bars
	(b)		Two valid worthwhile comparisons, with at least one mentioning context (cars or parking) and at least one comparing the whole distributions eg range or total number of cars or 'average'/comparing modal group	2	**1** for one valid worthwhile comparison (not necessarily mentioning context) Allow 1 mark for two acceptable statements in context which combine to form an acceptable comparison No FT from wrong graph in (a) leading to a wrong comparison	See appendix for examples **0** if wrong comments / wrong reasons / wrong values Condone 'people' instead of 'cars' in a comment but parking must also be mentioned to be eligible for context

Question			Answer	Marks	Part marks and guidance	
10			Freq densities: 0.7, 1.6, 2, 1, 0.3, 0.2 Bars all correct height Bars all correct width	**1** **1** **1**	Seen or used as heights; condone two errors	may be by table

11	(a)		6**b** – 6**a**	1	O –6**a** + 6**b** or 6(**b** – **a**) or –6(**a** – **b**)	
	(b)		3**a** + 3**b** or 3(**a** + **b**)		**M1** for 6**a** + ½ *their* (a) or $\overrightarrow{OA}+\frac{1}{2}\overrightarrow{AB}$ or 6**a** + $\frac{1}{2}\overrightarrow{AB}$ or the same using $\overrightarrow{OB}$	Working must be seen to award **M1**
	(c)	(	3**b** – 6**a**	1	O –6**a** + 3**b** or 3(**b** – 2**a**) or –3(2**a** – **b**)	
		(ii)	2**a** +2**b** or 2(**a** + **b**)	2	**M1** for $\overrightarrow{OG}=6\mathbf{a}+\frac{2}{3}$*their* $(3\mathbf{b}-6\mathbf{a})$ or $\overrightarrow{OA}+\frac{2}{3}\overrightarrow{AM}$ or $\overrightarrow{OM}+\frac{1}{3}\overrightarrow{MA}$ or 3**b** – $\frac{1}{3}$ *their*(3**b** – 6**a**)	Working must be seen to award **M1**
	(d)		Collinear or $\overrightarrow{OG}=\frac{2}{3}\overrightarrow{ON}$ oe	1	Independent mark, accept 'on the same line'	Ignore superfluous comments but penalise conflicting comments

12	**(a)**	(ii) $1+\sqrt{5}$	**3**	**B2** for $6+3\sqrt{5}-2\sqrt{5}-\sqrt{25}$ or better or **B1** for any 2 terms including negative sign seen	
	(b)	840	**2**	**M1** for $120\sqrt{49}$ or better or 84 or a correct attempt to convert one measurement **and** multiply	eg $20\sqrt{70}$ seen and attempt to multiply will score BOD **M1**
		mm^2	**1**	Dependent on consistent units used Note that $8.4cm^2$ is correct and scores 3	eg if $60\sqrt{7} \times 2\sqrt{7}$ cm^2 seen this will score **M0 B1** (BOD) for attempt to use units cm^2 correctly