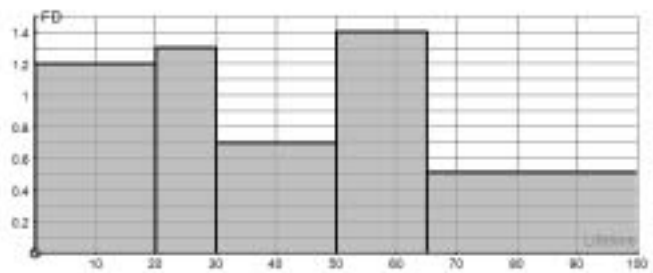
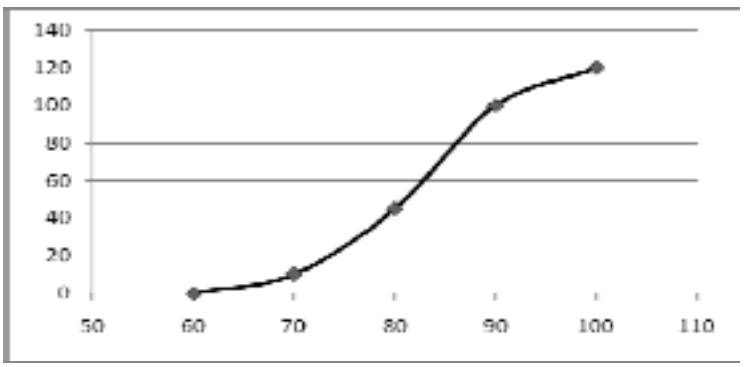
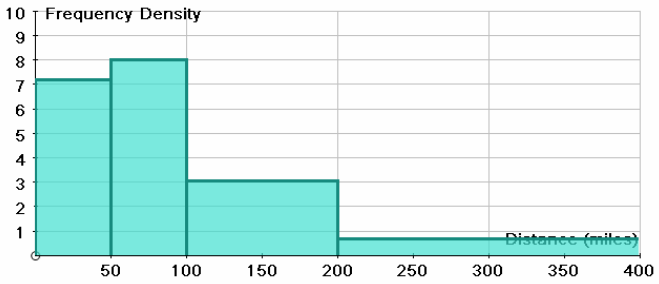
1 (i)	Positive skewness	B1	**1**
(ii)	Inter-quartile range = 10.3 – 8.0 = 2.3 Lower limit 8.0 – 1.5 × 2.3 = 4.55 Upper limit 10.3 + 1.5 × 2.3 = 13.75 Lowest value is 7 so no outliers at lower end Highest value is 17.6 so at least one outlier at upper end.	B1 M1 for 8.0 – 1.5 × 2.3 M1 for 10.3 + 1.5 × 2.3 A1 A1	**5**
(iií)	Any suitable answers Eg minimum wage means no very low values Highest wage earner may be a supervisor or manager or specialist worker or more highly trained worker	E1 one comment relating to low earners E1 one comment relating to high earners	**2**
		TOTAL	**8**

2 (i)	<table><tr><th>Lifetime (x hours)</th><th>Frequency</th><th>Width</th><th>FD</th></tr><tr><td>$0 < x \leq 20$</td><td>24</td><td>20</td><td>1.2</td></tr><tr><td>$20 < x \leq 30$</td><td>13</td><td>10</td><td>1.3</td></tr><tr><td>$30 < x \leq 50$</td><td>14</td><td>20</td><td>0.7</td></tr><tr><td>$50 < x \leq 65$</td><td>21</td><td>15</td><td>1.4</td></tr><tr><td>$65 < x \leq 100$</td><td>18</td><td>35</td><td>0.51</td></tr></table> 	M1 for fds A1 CAO Accept any suitable unit for fd such as eg freq per 10 hours. L1 linear scales on both axes and label on vert axis W1 width of bars H1 height of bars	**5**
(ii)	Median lies in third class interval ($30 < x \leq 50$) Median = 45.5th lifetime (which lies beyond 37 but not as far as 51)	B1 CAO E1 *dep* on B1	**2**
		TOTAL	**7**

3	**(i)**	$10 \times 2 = 20$.	M1 for 10×2 A1 CAO	**[2]**
	(ii)	Mean $= \dfrac{10\times65+35\times75+55\times85+20\times95}{120} = \dfrac{9850}{120} = 82.08$ It is an estimate because the data are grouped.	M1 for midpoints M1 for double pairs A1 CAO E1 indep	**[4]**
	(iii)	$10 \times 65^2 + 35 \times 75^2 + 55 \times 85^2 + 20 \times 95^2$ (= 817000) $S_{xx} = 817000 - \dfrac{9850^2}{120}$ (= 8479.17) $s = \sqrt{\dfrac{8479.17}{119}} = 8.44$	M1 for Σfx^2 M1 for valid attempt at S_{xx} A1 CAO	**[3]**
	(iv)	$\bar{x} - 2s = 82.08 - 2\times8.44 = 65.2$ $\bar{x} + 2s = 82.08 + 2\times8.44 = 98.96$ So there are probably some outliers.	M1 FT for $\bar{x} - 2s$ M1 FT for $\bar{x} + 2s$ A1 for both E1 dep on A1	**[4]**
	(v)	Negative.		**[1]**
	(vi)	Upper bound 60 70 80 90 100 Cumulative frequency 0 10 45 100 120 	C1 for cumulative frequencies S1 for scales L1 for labels 'Length and CF' P1 for points J1 for joining points dep on P1 All dep on attempt at cumulative frequency. **TOTAL**	**[5]** **[19]**

4 **(i)**	Distance fr width f dens 0- 0 50 7.200 50- 0 50 8.000 100- 7 100 3.070 200-400 133 200 0.665  	M1 for fds A1 CAO Accept any suitable unit for fd such as eg freq per 50 miles. L1 linear scales on both axes and label W1 width of bars H1 height of bars	**5**
(ii)	Median = 600th distance Estimate = $50 + {}^{240}/_{400} \times 50 = 50 + 30 = 80$	B1 for 600^{th} M1 for attempt to interpolate A1 CAO	**3**
		TOTAL	**8**