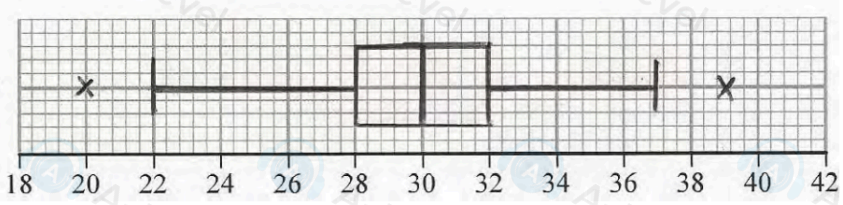
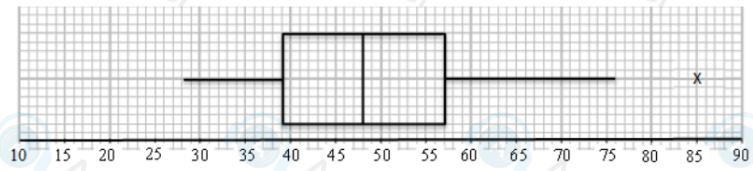
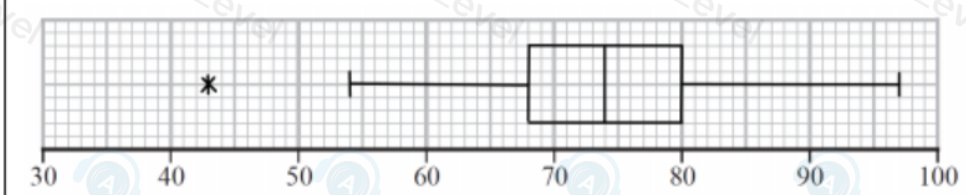
Question Number	Scheme	Marks
2.(a)	29	B1 (1)
(b)	Median = 30 IQR = 32 – 28 = 4	B1 M1 A1 (3)
(c)	'32'+1.5('4')[=38] or '28'−1.5('4')[=22]  	M1 B1 B1ft A1 (4)
(d)	*Westyou*: $[Q_2-Q_1=3,\ Q_3-Q_2=1 \text{ or } (Q_2-Q_1)>(Q_3-Q_2)]\Rightarrow$ -ve(skew) *Eastyou*: $[Q_2-Q_1=2,\ Q_3-Q_2=2 \text{ or } (Q_2-Q_1)=(Q_3-Q_2)]\Rightarrow$ symmetrical	B1B1ft depB1 (3)
	Notes	Total 11

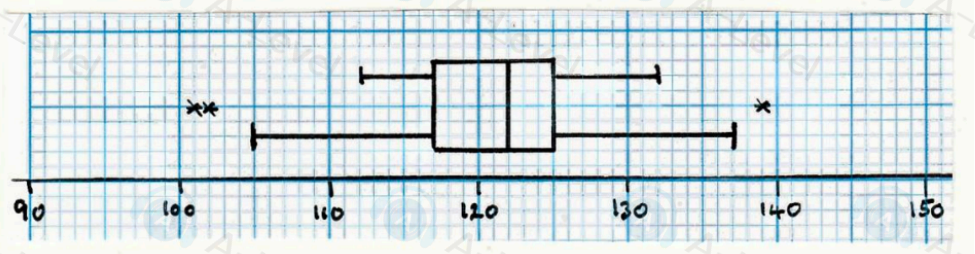
Question	Scheme	Marks
8.(a)	(Time is) <u>continuous</u>	B1 (1)
(b)	40 people = 8 large squares/200 small squares 200 people = 40 large squares/1000 small squares 40/(21 – 11) or correct scale on f.d. axis	B1
	$\frac{x}{40}=\frac{180}{200}$ or $\frac{x}{40}=\frac{7.2}{8}$ or $(21-18)\times4+(25-21)\times6$	M1
	36 people (spent between 18 and 25 minutes shopping in the supermarket)	A1 (3)
(c)	Median $=26+\frac{[30]}{36}\times5=$ awrt **<u>30.2</u>**	M1A1 (2)
(d)	$\sum fx = 16\times40+23.5\times30+28.5\times36+33.5\times40+38.5\times14+46\times20+61\times20$ $=6390$ **	M1 A1cso (2)
(e)	i $\bar{x}=\frac{6390}{200}=31.95$	B1
	ii $\sigma=\sqrt{\frac{238430}{200}-31.95^2}=\sqrt{171.3475}=13.09$ (or $s=13.122$) awrt **<u>13.1</u>**	M1A1 (3)
(f)	0.409... awrt **<u>0.4</u>**	B1 (1)
(g)	Method 1: (positive) skew or median ≠ mean oe; not a good decision Method 2 (see note): (almost) symmetric oe; a good decision	B1 dB1 (2) **Total 14**

Question	Scheme	Marks
1 (a)	$k = 3$	B1
		(1)
(b)	$Q_1 = 39 \quad Q_3 = 57$	B1 B1
		(2)
(c)	"57"+1.5×("57"−"39") or "39"−1.5×("57"−"39")	M1
	84 **and** 12 therefore only 1 outlier [85]	A1
		(2)
(d)		M1 M1 M1 A1
		(4)
(e)	A correct difference of the **medians** with supporting figures e.g. On average Birch [trees grow slightly] **taller** as the **median** is larger **48 > 45** oe **or** A correct difference of the **spread** with supporting figures e.g. Maple has a greater spread/variation of **heights** as the **range** is larger **55 > 48** (excluding outlier) oe e.g. Birch has a greater spread/variation of **heights** as the **range** is larger **57 > 55** (with outlier) oe	B1ft
		(1)
(f)	36 ,, $a < x$ where 43 ,, x ,, 45 **or** 54 ,, $2a$,, 80	M1
	36 ,, a ,, "43" and 54 ,, $2a$,, 80	A1ft
	36 ,, a ,, 40	A1
		(3)
	Notes	**Total 13**

Question	Scheme	Marks
3(a)	Width = 1.25 [cm]	B1
	18.75 cm^2 for freq of 20 so $\frac{18.75}{20}\times 16 = 15$ cm^2 for a frequency of 16 or $w\times h = 15$ or fd = 5	M1
	$[h = 15\div 1.25$ or $h = 8\div 5\times 7.5$ =] 12 (cm)	A1
		(3)
(b)	$Q_2 = [32+]\frac{7}{20}\times 4$ or using $n+1$ gives $Q_2 = [32+]\frac{7.5}{20}\times 4$	M1
	=33.4 ($n+1$ gives 33.5)	A1
		(2)
(c)	$\bar{y} = \frac{104}{50}[=2.08]$ | $\sum(w-20) = 10\times 104[=1040]$ or $\sum w = 10\times 104 + 50\times 20[=2040]$	M1
	$\bar{w} = 10\times$"2.08"$+20$ $= 40.8$* | $\frac{\text{"1040"}}{50}+20 = 40.8$ or $\frac{\text{"2040"}}{50} = 40.8$	A1*
		(2)
(d)	$[\text{Variance of } y =]\frac{233.54}{50} - (\text{"2.08"})^2 \left[= \frac{861}{2500} = 0.3444\right]$ or 10 × sd of y = sd of w	M1
	or $100\times 233.54 = \sum(w^2) - 40\times$"2040"$+ 50\times 400 \left[\Rightarrow \sum(w^2) = 84954\right]$ oe	
	$[\text{Variance of } w =]$"0.3444"$\times 100$ or $\frac{\text{"84954"}}{50} - 40.8^2 \left[= \frac{861}{25} = 34.44\right]$	M1
	or sd of $y = \sqrt{\text{"0.3444"}} \left[= \frac{\sqrt{861}}{50} = 0.5868...\right]$	
	sd of $w = \sqrt{\text{"0.3444"}\times 100}$ or $\sqrt{\text{"34.44"}}$ or $10\times\text{"}\frac{\sqrt{861}}{50}\text{"}$	M1
	= 5.868… awrt 5.87	A1
(e)(i)	The mean would not change (as 40.8 is the mean)	B1
(ii)	The standard deviation would decrease (as 40.8 is in the middle so data closer together)	B1
	Both correct with a correct reason for why the standard deviation decreases	ddB1
		(3)
	Notes	**Total 14**

Question Number	Scheme	Marks
2. (a)	[Median =] **74**	B1
		(1)
(b)	$Q_1 = 68$ $Q_3 = 80$	M1
	[IQR = 80 – 68 =] **12**	A1
		(2)
(c)	$Q_1 - 1.5\times(\text{IQR}) = \text{"68"} - 1.5\times\text{"12"}$ [= **50**]	M1
	or $Q_3 + 1.5\times(\text{IQR}) = \text{"80"} + 1.5\times\text{"12"}$ [=**98**]	
	Outliers are < **50** or > **98**	A1ft
	So there is just one outlier at **43**	A1
		(3)
(d)		M1 A1ft A1
		(3)
		[9 marks]
	Notes	

2.	**(a)**	Year 7 median = 29 Year 11 median = 54	B1 B1 (2)
	(b)	[Lower quartile =] 22 [Upper quartile =] 42	B1 B1 (2)
	(c)	Year 7 $Q_3 - Q_2$ (=13) > $Q_2 - Q_1$ (=7) Positive skew Year 11 $Q_3 - Q_2$ (=5) < $Q_2 - Q_1$ (=16) Negative skew	M1 A1 A1 (3)
	(d)	Data is skewed Data is not continuous	B1 B1 (2) **(9 marks)**

Question Number	Scheme	Marks
6. **(a)**	$Q_1 = 117$ $Q_2 = 122$ $Q_3 = 125$	B1B1B1 (3)
(b)	IQR = 125 – 117 = **8**	B1ft (1)
(c)	Upper limit: 125 + 1.5×8 = 125 + 12 = 137 Lower limit: 117 – 12 = 105 Outliers are: **101** **102** and **139**	M1A1 A1ft (3)
(d)		M1 A1ft B1 B1 (4)
(e)	[$\bar{x}$ =] **121** $[\sigma_x =]\sqrt{\frac{279709}{19} - \bar{x}^2} = \sqrt{14721.526... - 14641} = \sqrt{80.526...}$,= awrt **8.97**	B1 M1,A1 (3)
(f)	$\bar{x} + 2.7\times\sigma_x =$ awrt 145 $\bar{x} - 2.7\times\sigma_x =$ awrt 96.8 (allow 97)	M1A1 (2)
(g)	Probably not suitable… since: data is skewed or (f) says no outliers, (c) says 3 or (a) says median = 122, (e) says mean = 121	B1 (1) **[Total 17]**