

Question	Scheme	Marks	AOs
4 (a)	Tr(ace) (data needs to be converted to numbers before the calculation can be carried out)	B1	2.4
		(1)	
(b)	$[1+]^{\frac{138-131}{24}} \times 4$	M1	2.1
	= 2.1666.... awrt <u>2.17</u>	A1	1.1b
		(2)	
(c)	$\sigma = \sqrt{\frac{7704.1875}{184} - \left(\frac{539.75}{184}\right)^2} = 5.7676... \quad \sigma = \text{awrt } \underline{\underline{5.77}}$	M1 A1	1.1b 1.1b
		(2)	
(d)(i)	Using class midpoints to estimate the mean assumes that the values are uniformly distributed within the class(es) .	B1	2.4
(ii)& (iii)	This is not the case here as the majority of the data (in the first class) are 0.	B1	2.3
	The actual mean is likely to be <u>smaller</u> than the estimate (since the first group has more values at 0 and close to 0)	dB1	2.2b
		(3)	

(8 marks)

Notes			
(a)	B1: Identifying tr(ace) data Ignore comments about n/a, missing data, anomalies, etc.		
(b)	M1: Correct fraction $\frac{7}{24} \times 4$ allow working down $[5] - \frac{155-138}{24} \times 4$ allow a correct equation leading to a correct fraction e.g. $\frac{x-1}{5-1} = \frac{138-131}{155-131}$ for M1 Use of $(n + 1)$ with 138.75 allow $\frac{7.75}{24} \times 4$ A1: awrt 2.17 (condone $\frac{13}{6}$) awrt 2.29 from $(n + 1)$ (condone $\frac{55}{24}$)		
(c)	M1: Correct expression for standard deviation (allow mean = awrt 2.93) A1: awrt 5.77 correct answer only scores M1A1 (allow s = 5.78) SC: 5.76 with no working scores M1A0		
(d)(i)	B1: Explaining that data assumed to be spread evenly across each class (o.e.) e.g. The midpoint of each class is the <u>mean</u> of each class or all the values in the class are located at the midpoint condone normally distributed within each class		
Mark together (ii)&(iii)	B1: Demonstrating an understanding of the LDS that the majority of data values (in the first class) are at 0 or close to 0 (trace). dB1: (dependent upon 2 nd B1) Correct inference based on knowledge of the LDS SC: If B1 is scored in (i) for ‘The data are spread evenly across each class,’ then in (ii) ‘The data are not evenly distributed in the classes’ scores B1 but in (iii) ‘the actual mean is smaller’ with no further justification scores B0		