Measures of Dispersion Mark Scheme

Q1.

Question number	Answer	Additional guidance	Mark
(a)	B1 IQR would not be affected by outliers/anomalies/extreme house prices/extreme values OR IQR would allow comparison/measure of the spread/variability of the middle 50% of house prices/data	B1 for appropriate reason why the IQR would be appropriate Condone IQR would allow comparison/measure of the spread/variability (of the middle 50%) of house prices/data (in 1996 and 2016)	(1)
(b)	B1 e.g. the target audience might not understand IQR	B1 for appropriate reason why the IQR would not be appropriate Allow IQR only covers 50% of the data / does not include all of the data.	(1)

Q2.

Question	Answer	Additional guidance	Mark
(a)	M1 $36 - 23$ A1 13	M1 for attempt at IQR with at least one quartile (36 or 23) correct	(2)
(b)(i)	B1 The interquartile range is lower for phone B	B1 for correct comparison ft from *their* 13	(1)
(b)(ii)	M1 $36 + 8$ A1 44		(2)

Q3.

Question number	Answer	Additional guidance	Mark
	M1A1A1 for calculation of range or IQR OR for a pair of box plots drawn **Range** M1 74 − 40 or 70 − 43 A1 34 A1 27 OR **IQR** M1 65 − 53 or 63 − 53 A1 12 A1 10 B1 for e.g. The range/IQR for French presidents is greater than the range/IQR for UK prime ministers oe B1 for e.g. The ages of French presidents are more varied than the ages of UK prime ministers	M1 for a calculation of range or IQR OR for a pair of box plots drawn A1 for one correct value OR for one correct box plot A1 for second correct value to allow a comparison to be made OR for second correct box plot (same scale) to allow comparisons to be made B1 for a correct comparison of ranges or IQRs B1 for a correct contextual interpretation of comparison of spread	(5)

Q4.

Question number	Answer	Additional guidance	Mark
	B1 B1 B1 B1 B1 for each of five correct aspects e.g. • Use of statistical words, e.g. average/spread is too vague in this context (conclusion not appropriate) • Comparing medians (conclusion appropriate) • Comparing ranges or IQRs, e.g. IQRs are the same (conclusion appropriate) or Pine Wood range greater than Acorn Wood range (conclusion not appropriate) • Identifying Acorn Wood as having a negative skew (conclusion not appropriate) • Identifying Pine Wood as having no skew or is symmetrical (conclusion not appropriate)	B1 B1 B1 B1 B1 for each of five correct comments assessing the appropriateness of the conclusions	(5)

Q5.

Question	Answer	Additional guidance	Mark
	B1 for e.g. the range is affected by extreme values		(1)

Q6.

Question	Answer	Additional guidance	Mark
(a)	B1 eg 'allows two data sets to be compared easily'	B1 for a suitable reason	(1)
(b)	B1 $a = 53$ B1 $b = 43$ B1 $c = 62$	B1 for each correct value found	(3)
(c)	B1 eg '$\frac{1}{2}$ as sample median is likely to be the same as the population median since it is a random sample'	B1 for $\frac{1}{2}$ and correct supporting reason (accept $\frac{12}{25}$ from the stem and leaf diagram)	(1)
(d)	B1 ft Canada IQR = 17 and UK IQR = 19 or Canada range = 43 and UK range = 44 B1 ft IQR/range in UK is greater than IQR/range in Canada B1 There is a greater spread of ages in the UK parliament	B1 for identifying both IQRs or ranges (allow ft from part (b)) B1 for a correct comparison of measure of spread (allow ft from part (b)) B1 for a correct conclusion in context	(3)

Q7.

Question number	Answer	Additional guidance	Mark

(a)	B1 Any one from
	  • Can still see the original data values (in a stem & leaf) o.e.
	  • Can use to find (accurate) values for, e.g.: median/mode/mean/average/quartile(s)/range /IQR
	  • Can identify outliers
		B1 for advantage of using a stem and leaf diagram
		Do not accept e.g. 'does not group data' to mean 'see original data' Condone 'it is more detailed/accurate' But do **not** accept, e.g.
		clearer / quicker or easier to plot/read/understand/interpret (all B0)
			(1)

(b)	B1 B1 B1 B1 for four correct statements from
	
	  • First hypothesis is supported / males are taller
	  • Males have a higher median (or mean) OR males are 2 cm (or 5 cm) taller on average, (Accept "163 > 161" or "165 > 160")
	  • Second hypothesis is not supported / female heights have greater spread
	  • Males have lower IQR (or lower range). (Accept $16 < 18$ or $45 < 50$)
	  • Median is more appropriate than mean (as males' data is positively skewed)
	
	B1B1 any two comments from
	  • conclusion(s) are not reliable (condone 'data' are not reliable)
	  • not a representative sample / only early arrivals
	  • small sample only (e.g. only/just used 20/40)
	  • quota sampling (or convenience sample)
	  • not random
	  • sample is only for college age / he didn't record age
		B1 for each of four statements from the options given, maximum 4 marks
		  • statement supporting first hypothesis (condone 'is correct')
		
		  • correct supporting evidence (can ignore figs for 'median') (Comparison of e.g. tallest male/female alone is B0)
		
		  • statement refuting second hypothesis (condone 'incorrect')
		
		  • correct use of measure of dispersion.
		
		  • recognition of appropriate average due to skew
			(6)

	• sample is for one area only / only his college	Note: for the first 4 marks it needs to be clear which hypothesis or gender their comment refers to. B1 for each of two statements from the options given, maximum 2 marks. **Allow each bullet once only.** **Do not accept contradictory comments for any bullet point.**	