STEM AND LEAF DIAGRAMS

AtoZrevision

DRAWING AND INTERPRETING STEM AND LEAF DIAGRAMS. MIXED QUESTIONS WITH STEM AND LEAF DIAGRAMS.

MARK SCHEME

Q1. AtoZrevision.com

Question	Answer	Additional guidance	Mark
(a)	B2 3 | 3 4 8 4 | 2 5 5 | 1 3 9 6 | 0 1 9 7 | 0 4 9 8 | 3 6 7 8 9 9 | 10 | 2 B1 Key: 4 | 2 represents 42 shots	B2 cao or if B2 not earned B1 for unordered diagram or ordered diagram with at most 2 errors B1 for correct key	(3)
(b)	M1 (20 + 1)/2 A1 65	M1 for evidence of their 10.5th value being considered e.g. circling the 10th and 11th terms	(2)
(c)	B1 There is no mode	B1 for correct statement explaining why the mode is not possible	(1)
(d)	B1 3		(1)
(e)	B2 for Jay is not necessarily correct because 57% is only an average figure for all 20 footballers and the top 3 may have a higher average than the top 20 Alternatively: M1 $\frac{57}{100} \times (88 + 89 + 102)$ or $\frac{159}{88+89+102} \times 100$ A1 = 159 so Jay is correct or = 57% so Jay is correct	B2 for correct interpretation and conclusion of the information given or B1 for a partially correct statement e.g. "the top 3 may have a higher average" with no conclusion M1 for correct interpretation of the data A1 for correct conclusion and 159(.03) or 56.9(8)%	(2)

Q2. AtoZrevision.com

Question	Scheme	Marks
(a)	7 | 4 6 6 8 8 | 1 2 5 7 9 9 | 5 7 8 10 | 0 1 2 3 Key 7|6 = 76 (points) Stems correct Ordered leaves correct (condone one error or omission) Fully correct with key	B1 B1 B1 (3)
(b)	88	M1A1 (2)
(c)	103 – 74 = 29	M1 A1 (2)
(d)	Bolton has a smaller median/Durham has a larger median Bolton has a larger range/Durham has a smaller range	B1ft B1ft (2)
(e)	Durham, as they have a higher median.	B2ft (2)
		[11]

Notes		
(a)	B1 for correct stems identified (may be reversed) B1 for correct ordered leaves (condone one error or omission) B1 for fully correct diagram with key	
(b)	M1 for using $\frac{n+1}{2}$ from ordered diagram or from ordered list or for identifying '87' **and** '89' (may be implied by a correct ft median from their stem and leaf diagram) A1 cao	
(c)	M1 for 103 – 74 or for identifying 103 and 74 seen together A1 cao	
(d)	B1ft for a correct comparison of **medians**. (for ft, must have an answer to (b)) B1ft for a correct comparison of **ranges** (for ft, must have an answer to (c)) Must use words in bold. Condone misspelling if intention is clear.	
(e)	B2ft for Durham plus correct supporting reason comparing medians (condone average here). Allow converse. Ignore comments about range or other values. (B1 for Durham with any reason)	

Q3. AtoZrevision.com

Question number	Answer	Additional guidance	Mark
(a)	B2 for correctly completing the 2017 season on the stem and leaf diagram B1 for a suitable key **2017 season** | | **2018 season** 1 | 9 2 | 5 6 9 3 | 5 7 9 9 6 | 4 | 3 3 5 5 5 7 6 5 5 5 4 2 2 | 5 | 0 2 2 4 6 8 8 6 4 2 1 1 | 6 | 4 5 6 5 4 4 2 | 7 | 0 2 5 | 8 | 4 | 9 | 0 Key: 4 | 9 | 0 represents a score of 94 in the 2017 season and 90 in the 2018 season	B2 for a fully correct back-to-back stem and leaf diagram (B1 for ordered diagram with at most 2 errors or for unordered diagram) AND B1 for a suitable key for the stem and leaf diagram. Accept a key given as two parts. If key given in two parts then this must be complete and there must be reference to 2017 and 2018 or it must be clear how this is interpreted for the two sides. e.g. 4 | 9 represents a score of 94 in the 2017 (season) and 9|0 represents a score of 90 in the 2018 (season) or |1|9 represents 19, 4|9| represents 94.	(3)
(b)	M1 for $58 - 39$ A1 19	M1 for $58 - k$ or $k - 39$ or for both 39 and 58 identified or for $59.5 - k$ or $k - 38.5$ or for both 38.5 and 59.5 identified (leads to IQR=21) or for $58 - k$ or $k - 38$ or for both 38 and 58 identified (leads to IQR=20) A1 accept 20 or 21 If working is seen then it must be correct and consistent with their answer for award of M1A1. Accept if answer given in table.	(2)

Q4.

Question number	Answer	Additional guidance	Mark
(a)	B1B1 for each of: • order the leaves/numbers • add a key	B1 for each improvement. Ignore extraneous comments. Do not allow comments referring only to titles or labels.	(2)
(b)	B1 for reliable and any one of • comes from known/trusted website • as they won't vary from one website to another/scores can be found all over the internet • data (on scores) very likely to be true	B1 for reliable **and** supporting reason Ignore extraneous comments once B1 is scored.	(1)
(c)	B1 e.g. 'not a suitable diagram as it does not show how data changes over time'	B1 for not suitable **and** appropriate supporting reason Allow 'Not suitable' and any reason which states or implies that 'time' is not shown in the diagram, e.g. 'no years given' Allow 'Not suitable' and a diagram which would show this e.g. 'time series' (condone scatter diagram)	(1)

Q5.

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)
(e)	B1 Any one from • used to select sample • used to identify the population	B1 for a correct use of a sample frame	(1)
(f)	B2 eg 'not a suitable sample frame since it does not include all members of the population'	B2 for assessing the suitability of the sampling frame with supporting reason (B1 for assessing the suitability of the sampling frame with incomplete reasoning)	(2)

Q6.

Question	Answer	Additional guidance	Mark
(a)	B1B1 for each appropriate comment from • Data must be formatted/cleaned • Data must be given in the same units/rounded to the nearest minute • Data must be ordered	B1B1 for each appropriate comment relating to the data	(2)
(b)(i)	B1 e.g. Not appropriate since the data is not bivariate	B1 for not appropriate with supporting reason about the data	(1)
(b)(ii)	B1 e.g. Appropriate since the data is continuous	B1 for appropriate with supporting reason	(1)
(b)(iii)	B1 e.g. Not appropriate since the data is all taken from one day	B1 for not appropriate with supporting reason about the data	(1)

Q7.

Question number	Answer	Additional guidance	Mark
(a)	B1 36		(1)
(b)	B1 median for Puzzle X > median for Puzzle Y B1 Puzzle Y is completed faster than Puzzle X	B1 for correct comparison B1 for correct contextual interpretation of the median	(2)
(c)	B1 22		(1)
(d)	B1 Puzzle X because it has the lowest range	B1ft for correct conclusion, ft their answer to (c) if less than 10	(1)
(e)	B1 The stem and leaf diagram is not ordered B1 The correct median is 37 (minutes)	B1 for explanation as to mistake in Hannah's method B1 for correct median	(2)

Q8. AtoZrevision.com

Question	Scheme	Marks
*(a)	• Data is **continuous** (Otherwise B1 for 'quantitative'/'numerical' o.e.)	B2 (2)
*(b)	• Data is **secondary** (allow **not primary**) so reliability is unknown.	B2 (2)
(c)	2 | 1 3 3 | 1 2 3 5 7 4 | 0 1 5 7 5 | 0 1 3 3 5 8 6 | 0 3 4 Key: 2 | 1 represents 21 (minutes)	B2 B1 (3)
(d)	46	B1ft (1)
(e)	11	B1ft (1)
(f)	64.5 – 20.5 = 44	M1 A1ft (2) [11]

	Notes	
*(a)	B2 for describing continuous nature of the data. Must use 'continuous' to score both marks. Otherwise allow B1 for description of data being numerical/numbers if no 'continuous'. Ignore extra non-contradictory comments. e.g. 'secondary continuous' is B2, 'quantitative discrete' is B1, 'qualitative continuous' is B0, 'discrete' is B0 SC If B0 allow B1 for 'primary'	
*(b)	B2 for recognising that the data is secondary **and** hence its reliability is unknown. Must use 'secondary' (or 'not primary') to score both marks. Note: accept comments implying unreliable but do **not** allow 'inaccurate'. Otherwise allow B1 for an incomplete answer; e.g. 'secondary' with no mention of reliability, or recognising it may not be reliable but no 'secondary'. But 'data may be **biased**' alone is B0 Ignore extra non-contradictory comments.	
(c)	B2 for fully correct stem and leaves (Accept 'upside down' i.e. 6 at top) Otherwise B1 for correct stem with three correct lines, or all leaves correct but unordered. (Condone stem as 20, 30, … for B1) Final B1 for a usable key ('minutes' not required)	
(d)&(e)	Allow ft from their attempt at <u>ordered</u> stem and leaf (or ordered list). e.g. if they have 19 values only then ft median must be 10th	
(f)	M1 for at least one of 64.5 or 20.5 seen. (Allow ft from their attempt at an <u>ordered</u> stem and leaf, or from an ordered list). A1 44 ft (must have used upper/lower bounds correctly)	

Q9.

Question number	Answer	Additional guidance	Mark
(a)	B1 Scotland and Italy	B1 for identifying both teams Allow in either order	(1)
(b)	B1 France and Italy	B1 for identifying both teams Allow in either order	(1)
(c)	B1 England	B1 cao	(1)
(d)	B2 for Yes AND a reason which uses information from both tables e.g. • Wales finished higher in the table than Scotland in both years • Wales finished 2nd and Scotland finished 3rd in 2018, Wales finished 1st and Scotland finished 5th in 2019 B1 for Yes AND a reason which uses information from one table e.g. • Wales finished 2nd and Scotland finished 3rd in 2018 • Wales won more matches than Scotland in 2019	B2 for a complete answer assessing the appropriateness of the conclusion Or if B2 not earned… B1 for an incomplete answer assessing the appropriateness of the conclusion	(2)
(e)	B1 for 28	B1 cao	(1)
(f)	B2 for no AND a correct reason e.g. the data is all in the 20s so there would only be one row in the stem and leaf diagram OR if B2 not earned… B1 for an incomplete answer e.g. no with an attempt at a reason OR correct reason without a conclusion	B2 for a complete answer assessing the appropriateness of the choice of diagram Allow B2 for yes AND a description of how this could be done i.e. have a 20-24 stem and a 25-29 stem OR if B2 not earned…. B1 for an incomplete answer assessing the appropriateness of the choice of diagram	(2)