GCSE Mathematics – Higher Tier

Spot the Mistake: Statistics

Solutions and mark scheme

Every question is worth 4 marks: (a) B1 for the correct line; (b) B1 for a clear explanation; (c) M1 for a correct method and A1 for the correct answer. Accept equivalent explanations and methods.

Q	(a)	(b) What went wrong	(c) Correct solution
1	Line 1	An estimate of the mean uses the *midpoint* of each group.	$4 \times 5 + 9 \times 15 + 5 \times 25 + 2 \times 35 = 350$; $350 \div 20 = 17.5$ minutes
2	Line 2	The values must be put in order first: 3, 5, 7, 8, 9, 12.	Median = $(7 + 8) \div 2 = 7.5$
3	Line 3	The classes are different sizes, so find the total of all the scores first.	$(20 \times 64 + 30 \times 54) \div 50 = 2900 \div 50 = 58$
4	Line 1	Use $1.5\times$ IQR, then add it to the upper quartile. IQR = $32 - 20 = 12$.	Limit = $32 + 1.5 \times 12 = 50$; $49 < 50$, so not an outlier
5	Line 2	Frequency = frequency density $\times$ class width.	$2.4 \times 15 = 36$
6	Line 2	Cumulative frequency is plotted at the *upper* class boundary.	Plot (0, 0), (10, 4), (20, 13), (30, 18), (40, 20)
7	Line 3	Consistency is judged by the spread, not the median.	Group B is more consistent because its IQR (8) is smaller than group A's (12)
8	Line 3	Correlation does not show causation. Both are likely caused by hot, sunny weather.	Days with more ice cream sales tend to have more sunburn cases, but one does not cause the other
9	Line 2	The sample must be in proportion to Year 10's share of the school.	$\frac{280}{1200} \times 60 = 14$ students
10	Line 2	The median is the middle *student*, not the middle size. With 30 students, find the 15.5th value.	Cumulative frequencies 2, 6, 11, 23: the 15th and 16th students are size 7, so median = 7