

Algebra 1 · Statistics: Center, Spread and Data Displays · Test Answer Key

Common Core S-ID.A.1, S-ID.A.2, S-ID.A.3 · mathovore.fr

Use this key to score the test out of 20 points. Each solution shows the ordered data, the quartiles and the arithmetic, followed by a scoring rule. Accept equivalent decimals, and give partial credit as described for clear, correct work.

Algebra 1 Common Core: S-ID.A.1 · S-ID.A.2 · S-ID.A.3

Question 1: Mean and median (2 points)

Sum = 126; mean = $126 \div 9 = 14$.

Ordered: 8, 9, 10, 11, 13, 14, 17, 21, 23. The 5th value is the median: 13.

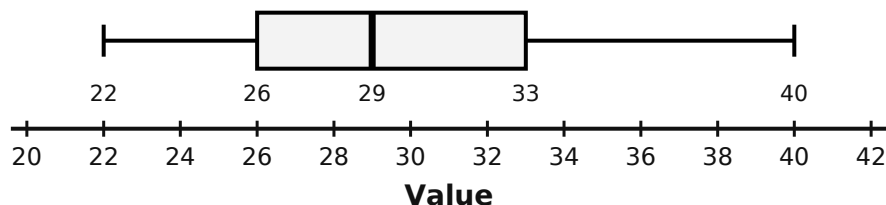
Mean 14, median 13

Scoring: 1 point for the mean; 1 point for the median.

Question 2: Five-number summary (3 points)

Ordered: 22, 24, 26, 27, 28, 30, 31, 33, 35, 40. Median = $\frac{28+30}{2} = 29$. Lower half 22, 24, 26, 27, 28: $Q_1 = 26$. Upper half 30, 31, 33, 35, 40: $Q_3 = 33$.

Five-number summary: **22, 26, 29, 33, 40**. IQR = $33 - 26 = 7$.



Box plot for question 2.

Scoring: 2 points for all five values (1 point if one or two are wrong); 1 point for the IQR 7.

Question 3: Read a box plot (2 points)

(a) Median 45. IQR = $60 - 35 = 25$. **Median 45, IQR 25**

(b) The top quarter of the data lies above Q_3 . **60**

Scoring: 1 point for part (a) with both values correct; 1 point for part (b).

Question 4: Read a histogram (2 points)

(a) $6+1=7$. **7 players**

(b) The median is the mean of the 10th and 11th values. The first interval holds 4 values and the second brings the total to 13, so both are in **10 to 20**.

Scoring: 1 point for each part.

Question 5: Standard deviation (3 points)

$$\text{Mean} = \frac{3+5+6+7+9}{5} = \frac{30}{5} = 6.$$

Differences: $-3, -1, 0, 1, 3$. Squares: 9, 1, 0, 1, 9, which add to 20.

Average $= 20 \div 5 = 4$. $\text{SD} = \sqrt{4} = 2$, that is **2.0**.

Scoring: 1 point for the mean 6; 1 point for the sum 20; 1 point for the SD 2.0.

Question 6: Interpret standard deviation (2 points)

(a) **Machine A.**

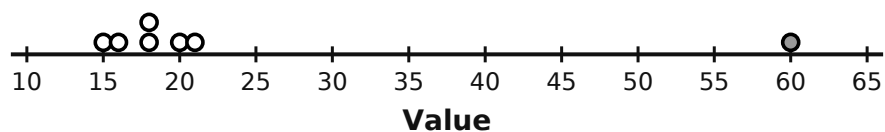
(b) Machine A has the smaller standard deviation, so its bag weights stay closer to 16.0 ounces. Bags from Machine B vary more, so more of them are noticeably underweight or overweight.

Scoring: 1 point for Machine A; 1 point for an explanation that connects the smaller SD to weights staying closer to the mean.

Question 7: Effect of an outlier (3 points)

(a) $\text{Mean} = 108 \div 6 = 18$; $\text{median} = \frac{18+18}{2} = 18$.

(b) $\text{New sum} = 168$; $\text{mean} = 168 \div 7 = 24$. The 7 ordered values have median 18 (the 4th).



Answer: the value 60 is far from the others.

(c) **The mean changed more** (from 18 to 24, while the median stayed at 18). The extreme

value 60 is pulled into the sum, but the median depends only on the middle position.

Scoring: 1 point for part (a); 1 point for part (b); 1 point for naming the mean with a reason.

Question 8: Compare two distributions (3 points)

(a) Both teams have the same median, 76 points.

(b) Team X: $IQR = 84 - 70 = 14$. Team Y: $IQR = 96 - 68 = 28$. Team Y's IQR is twice as large.

(c) **Team X** is more consistent: its middle 50% of scores covers 14 points, while Team Y's covers 28.

Scoring: 1 point for equal medians; 1 point for both IQRs and the comparison; 1 point for Team X with the reason.

Total
20 points