

Center, Spread and Data Displays Compared

Grade 9 – Algebra 1 math · Test Answer Key · Standards: S-ID.A.1, S-ID.A.2, S-ID.A.3

Use this answer key to score the test out of 20 points. Each solution lists where points are earned. Accept answers that follow the quartile method of the lesson, and give partial credit for a correct method with an arithmetic slip.

Standards: S-ID.A.1, S-ID.A.2, S-ID.A.3 · **Level:** Grade 9 Algebra 1

Question 1 Mean and Median (2 points)

Sum: 115; mean $115 \div 5 = \mathbf{23}$. Sorted: 15, 18, 22, 25, 35; median **22**.

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

Question 2 Five-Number Summary (3 points)

- Median (5th value) = 21. Lower half 12, 15, 15, 18 gives $Q1 = 15$. Upper half 22, 26, 30, 41 gives $Q3 = 28$. **Min 12, Q1 15, median 21, Q3 28, max 41.**
- $IQR = 28 - 15 = \mathbf{13}$. Fence: $28 + 1.5(13) = 47.5$, and $41 < 47.5$, so **41 is not an outlier.**

Scoring: (a) 1 point for the median and quartiles, 1 point for min and max. (b) 1 point.

Question 3 Dot Plot with an Extreme Value (3 points)

- The 5th and 6th values are 3 and 3: median **3**. Range $9 - 1 = \mathbf{8}$.
- $Q1 = 2$ and $Q3 = 4$, so $IQR = 2$. Fence: $4 + 1.5(2) = 7$. Since $9 > 7$, **9 is an outlier.**
- Mean with 9: $36 \div 10 = 3.6$. Without 9: $27 \div 9 = 3$. The median stays 3. **The mean is affected; the median is not.**

Scoring: 1 point per part.

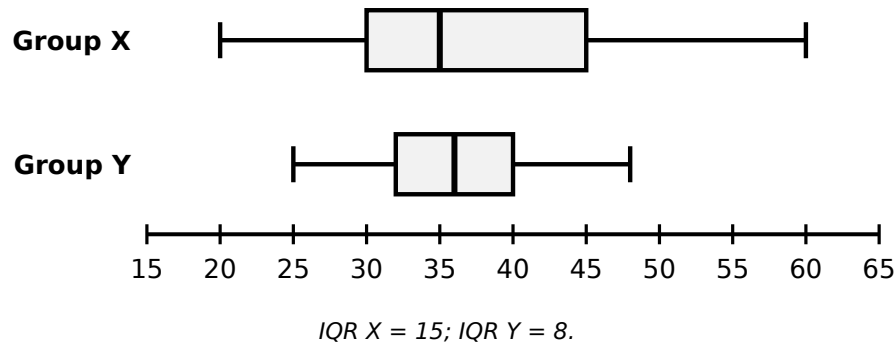
Question 4 Histogram Reading (2 points)

- The 10th and 11th values are needed. Counts: 5 values in 0–10, then 14 values by the end of 10–20. So both lie in **10 to 20 minutes**.
- Most waits are short and the tail extends to the right: **skewed right**.

Scoring: 1 point per part.

Question 5 Compare Two Groups (3 points)

- a. Medians: $X = 35$ and $Y = 36$, so **Group Y**.
- b. IQR of X: $45 - 30 = 15$. IQR of Y: $40 - 32 = 8$.
- c. **Group Y** is more consistent because its middle half of scores is spread over only 8 points, against 15 for X.



Scoring: 1 point per part.

Question 6 Standard Deviation by Reasoning (2 points)

Set B. Its values lie 10 units from the mean, while those of set A lie only 2 units from it. Greater distances from the mean give a greater standard deviation.

Scoring: 1 point for choosing B, 1 point for the explanation using distances from the mean.

Question 7 Missing Score (3 points)

- a. The total must be $5 \times 84 = 420$. The four known scores add to 336, so the fifth is **84**.
- b. Sorted: 76, 80, 84, 88, 92. The median is **84**.

Scoring: (a) 1 point for the total, 1 point for the score. (b) 1 point.

Question 8 Typical Salary (2 points)

- a. Sum 353; mean $353 \div 6 \approx 58.8$. Median $(43 + 45) \div 2 = 44$.
- b. The **median**, because the single high salary of 140 pulls the mean above five of the six salaries.

Scoring: 1 point per part.