Summarizing Data and Making Comparisons

Summarizing and comparing data: Mistakes and missing information

Name _____ **Date** _____ **Score** _____ / 6

QUICK REVIEW

Compare groups using the same measure and units. For A: $4, 5, 6$ and B: $1, 5, 9$, both means are 5, but ranges are 2 and 8, so A is more consistent by range. A larger mean is not always better: for wait times, a smaller mean is usually preferred. State the criterion rather than making an unsupported overall judgment.

Worked example

Find center and range; choose the more consistent group. A: $4, 5, 6$. B: $1, 5, 9$. Use the range for the decision.

1. A sum $= 15$, count 3, mean $= 15/3 = 5$; sorted $4, 5, 6$ gives median 5.
2. B sum $= 15$, count 3, mean $= 15/3 = 5$; sorted $1, 5, 9$ gives median 5.
3. Ranges: A $= 6 - 4 = 2$; B $= 9 - 1 = 8$. A is more consistent by range.
Answer: A: mean 5, median 5, range 2. B: mean 5, median 5, range 8. A is more consistent by range.

Practice Problems

Show your thinking.

1. A student chooses A as more consistent because its maximum is larger. Repair the decision. A: $1, 5, 9$. B: $4, 5, 6$. Use the range for the decision.

2. Recover a median-based comparison despite an extreme high value. A: $2, 3, 10$. B: $4, 5, 6$. Use the median for the decision.

3. A report says equal counts imply equal means. Test it. A: $3, 4, 5$. B: $4, 5, 6$. Use the mean for the decision.

4. Find both ranges to recover which group is more consistent. A: $2, 6, 10$. B: $4, 6, 8$. Use the range for the decision.

5. A student chooses the greater mean by looking only at the medians. Correct the comparison. A: $1, 2, 3, 18$. B: $4, 5, 6, 7$. Use the mean for the decision.

6. Explain why center alone cannot describe variability. A: $5, 7, 9$. B: $6, 7, 8$. Use the range for the decision.

Answer Key

1. A: mean 5, median 5, range 8. B: mean 5, median 5, range 2. B is more consistent by range.
2. A: mean 5, median 3, range 8. B: mean 5, median 5, range 2. B has the greater median.
3. A: mean 4, median 4, range 2. B: mean 5, median 5, range 2. B has the greater mean.
4. A: mean 6, median 6, range 8. B: mean 6, median 6, range 4. B is more consistent by range.
5. A: mean 6, median $\frac{5}{2}$, range 17. B: mean $\frac{11}{2}$, median $\frac{11}{2}$, range 3. A has the greater mean.
6. A: mean 7, median 7, range 4. B: mean 7, median 7, range 2. B is more consistent by range.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. A sum $= 15$, count 3, mean $= 15/3 = 5$; sorted $1, 5, 9$ gives median 5.
2. B sum $= 15$, count 3, mean $= 15/3 = 5$; sorted $4, 5, 6$ gives median 5.
3. Ranges: A $= 9 - 1 = 8$; B $= 6 - 4 = 2$. B is more consistent by range.

Problem 2

1. A sum $= 15$, count 3, mean $= 15/3 = 5$; sorted $2, 3, 10$ gives median 3.
2. B sum $= 15$, count 3, mean $= 15/3 = 5$; sorted $4, 5, 6$ gives median 5.
3. Ranges: A $= 10 - 2 = 8$; B $= 6 - 4 = 2$. B has the greater median.

Problem 3

1. A sum $= 12$, count 3, mean $= 12/3 = 4$; sorted $3, 4, 5$ gives median 4.
2. B sum $= 15$, count 3, mean $= 15/3 = 5$; sorted $4, 5, 6$ gives median 5.
3. Ranges: A $= 5 - 3 = 2$; B $= 6 - 4 = 2$. B has the greater mean.

Problem 4

1. A sum $= 18$, count 3, mean $= 18/3 = 6$; sorted $2, 6, 10$ gives median 6.
2. B sum $= 18$, count 3, mean $= 18/3 = 6$; sorted $4, 6, 8$ gives median 6.
3. Ranges: A $= 10 - 2 = 8$; B $= 8 - 4 = 4$. B is more consistent by range.

Problem 5

1. A sum $= 24$, count 4, mean $= 24/4 = 6$; sorted $1, 2, 3, 18$ gives median $\frac{5}{2}$.
2. B sum $= 22$, count 4, mean $= 22/4 = \frac{11}{2}$; sorted $4, 5, 6, 7$ gives median $\frac{11}{2}$.
3. Ranges: A $= 18 - 1 = 17$; B $= 7 - 4 = 3$. A has the greater mean.

Problem 6

1. A sum $= 21$, count 3, mean $= 21/3 = 7$; sorted $5, 7, 9$ gives median 7.
2. B sum $= 21$, count 3, mean $= 21/3 = 7$; sorted $6, 7, 8$ gives median 7.
3. Ranges: A $= 9 - 5 = 4$; B $= 8 - 6 = 2$. B is more consistent by range.

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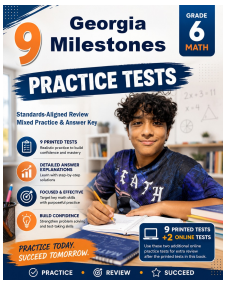

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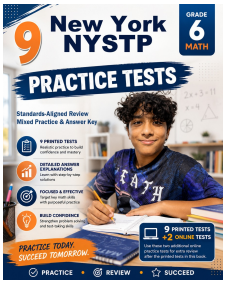

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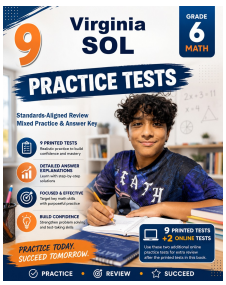

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