Comparing Populations with Measures of Center and Variability

Apply the skill to decisions and designs

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

QUICK REVIEW

Mean is sum divided by count; MAD is the mean distance from the mean. Order values before finding the median. For $1, 1, 10$, the median is 1 and the range is $10 - 1 = 9$. Use the same units when comparing centers or spreads.

Worked example

A scale gives readings of $22, 24, 25$ g, each 2 g too high. Give the corrected median and range.

1. Subtract 2 from each reading to get $20, 22, 23$ g.
2. The middle of the three corrected values is 22 g.
3. The range is $23 - 20 = 3$ g, the same as $25 - 22 = 3$ g before correction.
Answer: Median 22 g; range 3 g.

Practice Problems

Show your thinking.

1. A shuttle can use a route only if its mean trip time is at most 16 min and no trip exceeds 19 min. Times: A $13, 15, 17, 19$; B $12, 12, 16, 20$. Which route qualifies?

2. Pilot nozzle A records $8, 9, 9, 10$ mL; full production doubles each reading. B already runs at full size: $17, 18, 18, 19$ mL. Find both full-size means and MADs. Which nozzle meets a MAD limit of 0.75 mL?

3. A team wants a mean of at least 6 successful passes over six drills and a range of at most 5 passes. The first five counts are $3, 5, 6, 6, 7$. Can any final count meet both conditions?

4. A pickup schedule must have median wait at most 12 min and range at most 6 min. A recorded $10, 18, 12, 8, 10$ min; B recorded $11, 9, 12, 14, 10, 13$ min. Find both measures and choose a schedule.

5. A clinic logged waits of $18, 12, 45, 14, 16, 15$ minutes. The 45 was a confirmed timer error. Report mean and median with and without that entry. Which statistic changes less, and by how much does it change?

6. Two practice groups have times A: $8, 8, 10, 10$ s and B: $14, 14, 16, 16$ s. Each group has MAD 1 s. A director says the combined MAD stays 1 s. Find the combined mean and MAD.

Answer Key

1. Only A. Means: A 16 min, B 15 min; maxima: A 19 min, B 20 min.
2. Both means 18 mL. A MAD 1 mL; B MAD 0.5 mL. Only B meets the limit.
3. No. The mean needs at least 9 passes in the last drill; the range permits at most 8.
4. Only B. A: median 10 min, range 10 min. B: median 11.5 min, range 5 min.
5. Mean: 20 to 15 min. Median: 15.5 to 15 min; it drops only 0.5 min.
6. Combined mean 12 s; combined MAD 3 s, not 1 s.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. A mean: $(13 + 15 + 17 + 19)/4 = 64/4 = 16$ min.
2. B mean: $(12 + 12 + 16 + 20)/4 = 60/4 = 15$ min.
3. Both pass the mean limit. A has maximum 19 min, while B reaches $20 > 19$ min, so only A qualifies.

Problem 2

1. A at full size is $16, 18, 18, 20$ mL. Both full-size sets sum to 72 mL, so mean $= 72/4 = 18$ mL.
2. A MAD: $(2 + 0 + 0 + 2)/4 = 1$ mL.
3. B MAD: $(1 + 0 + 0 + 1)/4 = 0.5$ mL. Thus $0.5 \le 0.75 < 1$, so only B qualifies.

Problem 3

1. The first five counts total $3 + 5 + 6 + 6 + 7 = 27$. The mean target needs at least $6 \times 6 = 36$ passes in all.
2. The last count must be at least $36 - 27 = 9$. With a recorded 3, that gives range at least $9 - 3 = 6$.
3. To keep the range at most 5, no count can exceed $3 + 5 = 8$. There is no count that meets both limits.

Problem 4

1. Order A: $8, 10, 10, 12, 18$. The third of five values is 10 min. Range: $18 - 8 = 10$ min.
2. Order B: $9, 10, 11, 12, 13, 14$. Median: $(11 + 12)/2 = 11.5$ min. Range: $14 - 9 = 5$ min.
3. Both medians are at most 12 min, but A has range $10 > 6$ min. B has range $5 \le 6$ min and meets both limits.

Problem 5

1. With all six entries, the total is $12 + 14 + 15 + 16 + 18 + 45 = 120$ min and the mean is $120/6 = 20$ min.
2. The middle two of the ordered six waits are $15, 16$. Their median is $(15 + 16)/2 = 15.5$ min.
3. Without 45, the mean is $(120 - 45)/5 = 15$ min. The third of $12, 14, 15, 16, 18$ is 15 min.
4. The mean drops $20 - 15 = 5$ min; the median drops $15.5 - 15 = 0.5$ min, less than the mean.

Problem 6

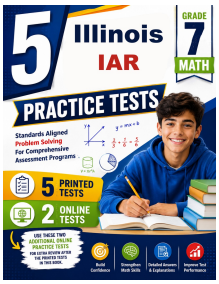
1. The eight times total $36 + 60 = 96$ s, giving mean $96/8 = 12$ s.
2. Distances from 12: $4, 4, 2, 2, 2, 2, 4, 4$ s. Their sum is 24 s.
3. Combined MAD $= 24/8 = 3$ s. Times from the two groups lie apart even when each group is tightly clustered.

TESTINAR

Keep Building Grade 7 Math Skills

Choose the practice book matched to your state assessment and turn worksheet practice into a complete test-prep plan.

All Grade 7 books



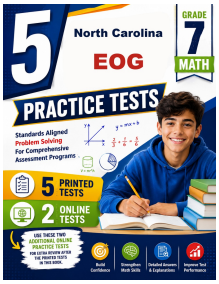
ILLINOIS IAR

5 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 5 printable practice tests.

Printable eBook • Instant PDF access

View eBook



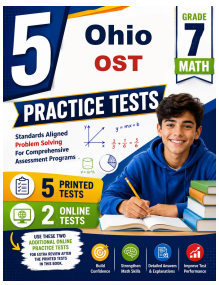
NORTH CAROLINA EOG

5 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 5 printable practice tests.

Printable eBook • Instant PDF access

View eBook



OHIO OST

5 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 5 printable practice tests.

Printable eBook • Instant PDF access

View eBook

Need a different state?
Testinar has Grade 7 math practice books for state assessments across the country.

TESTINAR.COM/GRADES/7