

Comparing Two Data Sets with Variability

Grade 7 math · Worksheet Answer Key · Standards: 7.SP.B.3, 7.SP.B.4

Each solution shows the center, the measure of spread and the comparison, with distances from the mean listed for every MAD. Check the order of steps: find the mean first, then the distances, then divide by the number of values.

Standards: 7.SP.B.3, 7.SP.B.4 · **Level:** Grade 7

Problem 1 Find the mean

Sum: $12 + 15 + 9 + 14 + 10 = 60$. Mean: $60 \div 5 = 12$.

12 minutes

Problem 2 Median and range

In order: 17, 18, 20, 22, 25, 28, 30. The middle value is 22. Range: $30 - 17 = 13$.

median 22 miles; range 13 miles

Problem 3 Mean absolute deviation

Mean: $28 \div 4 = 7$. Distances: 2, 2, 0, 0. Sum: 4. MAD: $4 \div 4 = 1$.

MAD = 1

Problem 4 Read a box plot

Median: 23. IQR: $27 - 18 = 9$. Range: $35 - 14 = 21$.

median 23; IQR 9; range 21

Problem 5 Compare two means

$84 - 78 = 6$, and Class B is higher.

Class B, by 6 points

Problem 6 Which set is more spread out

Range of P: $7 - 3 = 4$. Range of Q: $9 - 1 = 8$.

Set Q is more spread out (range 8 versus 4)

Problem 7 Gap in MADs

Difference: $21 - 15 = 6$. $6 \div 2 = 3$.

3 times the MAD

Problem 8 MAD of eight values

Sum: 96, so mean = $96 \div 8 = 12$.

Distances: 0, 3, 3, 2, 2, 0, 4, 4. Sum: 18. MAD: $18 \div 8 = 2.25$.

mean 12; MAD 2.25

Problem 9 Seedling heights

Mean P: $230 \div 10 = 23$ cm. Mean Q: $300 \div 10 = 30$ cm.

Distances for P: 4, 2, 1, 0, 0, 0, 0, 1, 2, 4. Sum 14, so MAD = 1.4 cm.

Difference: $30 - 23 = 7$. $7 \div 1.4 = 5$.

means 23 cm and 30 cm; MAD 1.4 cm; the difference is 5 MADs

Problem 10 Two classes in box plots

Class A: median 72, IQR $80 - 65 = 15$. Class B: median 78, IQR $85 - 70 = 15$.

Difference of medians: $78 - 72 = 6$. $6 \div 15 = 0.4$.

medians 72 and 78; both IQR 15; difference is 0.4 of the IQR

Problem 11 Small gap

Difference: $52 - 48 = 4$ minutes. $4 \div 6 \approx 0.67$.

The centers are less than 1 MAD apart, so the data overlap a lot.

about 0.67 MAD; the difference is small

Problem 12 Quartiles from a list

There are 11 values; the median is the 6th: 12.

Lower half: 5, 7, 8, 8, 10, so $Q1 = 8$. Upper half: 13, 15, 16, 20, 21, so $Q3 = 16$.

IQR: $16 - 8 = 8$.

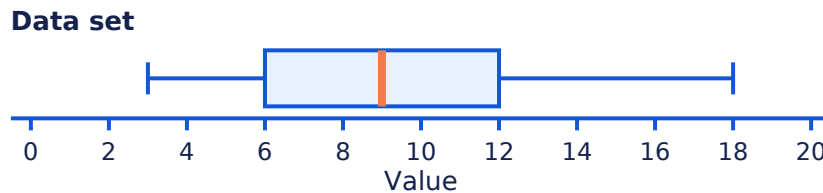
median 12; Q1 8; Q3 16; IQR 8

Problem 13 Build a box plot

Mark 3, 6, 9, 12 and 18 on a number line. Draw a box from 6 to 12 with a line at 9, and whiskers to 3 and 18.

Range: $18 - 3 = 15$. IQR: $12 - 6 = 6$.

range 15; IQR 6



Problem 14 Check a statement

Difference of the means: $36 - 30 = 6$. $6 \div 4 = 1.5$.

Yes: the means are 1.5 MADs apart

Problem 15 Pizza delivery times

Mean X: $280 \div 10 = 28$. Mean Y: $400 \div 10 = 40$.

Distances for X: 6, 3, 3, 0, 0, 0, 0, 3, 3, 6. Sum 24, so $MAD = 2.4$.

Difference: $40 - 28 = 12$. $12 \div 2.4 = 5$.

means 28 and 40 minutes; MAD 2.4; 5 MADs apart; Shop X is faster

Problem 16 Swim times

Lena: median 62, IQR $65 - 60 = 5$. Omar: median 61, IQR $63 - 59 = 4$.

Difference of medians: 1 second. $1 \div 5 = 0.2$ of the larger IQR.

medians 62 and 61; IQR 5 and 4; the gap is only 0.2 IQR, so neither swimmer is clearly faster

Problem 17 Two weeks of weather

Week 1: sum 420, mean 70. Distances: 4, 0, 2, 2, 4, 0. Sum 12, MAD = 2.

Week 2: sum 456, mean 76. Distances: 4, 0, 2, 2, 4, 0. Sum 12, MAD = 2.

Difference: $76 - 70 = 6$. $6 \div 2 = 3$.

means 70°F and 76°F; both MAD 2°F; the means differ by 3 MADs

Problem 18 Quiz scores of two classes

P: sum 42, mean 7. Distances: 2, 1, 0, 0, 1, 2, sum 6, MAD = 1.

Q: sum 48, mean 8. Distances: 2, 1, 0, 0, 1, 2, sum 6, MAD = 1.

Difference: 1 point, which is 1 MAD.

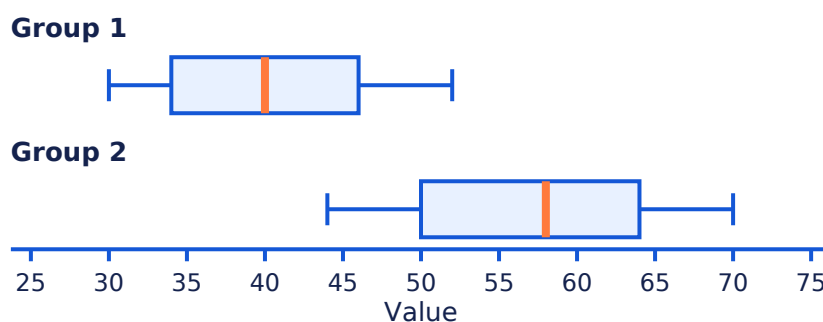
means 7 and 8; both MAD 1; the difference is only 1 MAD, so the classes overlap a lot

Problem 19 Medians and spread

IQR of Group 1: $46 - 34 = 12$. IQR of Group 2: $64 - 50 = 14$. The spreads are similar.

Difference of medians: $58 - 40 = 18$. $18 \div 12 = 1.5$.

IQRs 12 and 14; the medians differ by 1.5 times the IQR of Group 1



Problem 20 Tomato plots

Plot 1: sum 56, mean 7. Distances: 2, 1, 1, 0, 0, 1, 1, 2. Sum 8, MAD = 1.

Plot 2: sum 72, mean 9, and the same MAD of 1.

Difference: $9 - 7 = 2$ ounces, or 2 MADs.

means 7 oz and 9 oz; MAD 1 oz for both; a difference of 2 MADs, so the plots overlap but Plot 2 is clearly heavier on average