

Grade 7 - Comparing Two Populations - Answer Key

Common Core 7.SP.B.3, 7.SP.B.4 · maths-pdf.fr/en/

Use this answer key to check your work on the comparing populations worksheet. Every solution shows the steps, and the final answer appears in bold. If your answer is different, compare each step and look for the first place where the work changes.

Grade 7 · Common Core State Standards: **7.SP.B.3, 7.SP.B.4**

Exercise 1 - Mean and median

Mean: $(12+15+15+18+20) \div 5 = 80 \div 5 = 16$.

Median: the middle value is 15.

mean 16; median 15

Exercise 2 - MAD

Mean: $40 \div 5 = 8$.

Distances: 4, 2, 0, 2, 4. Sum: 12.

$12 \div 5 = 2.4$

MAD 2.4

Value	Distance from 8
4	4
6	2
8	0
10	2
12	4

Distances from the mean.

Exercise 3 - Same mean, different spread

Both means are 10.

Team A distances: 2, 1, 0, 0, 1, 2, sum 6, MAD $6 \div 6 = 1$.

Team B distances: 6, 4, 0, 0, 4, 6, sum 20, MAD $20 \div 6 \approx 3.3$.

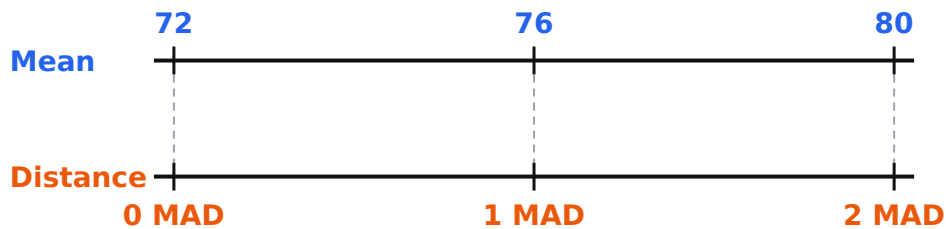
Same mean; Team B is more variable

Exercise 4 - Difference in MADs

$$80 - 72 = 8.$$

$$8 \div 4 = 2$$

2 times the MAD



Exercise 5 - Read a box plot

$$\text{Range: } 30 - 10 = 20.$$

$$\text{IQR: } 24 - 14 = 10.$$

range 20; IQR 10

Exercise 6 - Quartiles

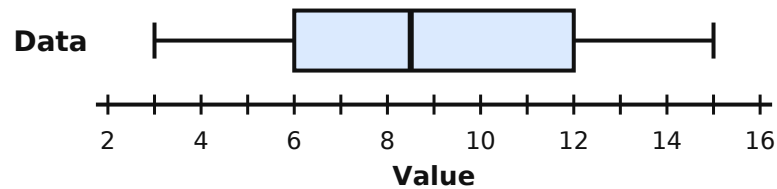
Lower half: 3, 5, 7, 8; Q1 is $(5+7) \div 2 = 6$.

Median: $(8+9) \div 2 = 8.5$.

Upper half: 9, 11, 13, 15; Q3 is $(11+13) \div 2 = 12$.

IQR: $12 - 6 = 6$

Q1 = 6; median = 8.5; Q3 = 12; IQR = 6



Box plot of the data.

Exercise 7 - Compare medians

Boys: median 25, range $32 - 20 = 12$.

Girls: median 24, range $29 - 18 = 11$.

Boys' median is 1 minute higher; the spreads are similar

Exercise 8 - Mean of two samples

Sample 1: $493 \div 7 \approx 70.4$.

Sample 2: $454 \div 7 \approx 64.9$.

Difference: about $70.4 - 64.9 = 5.5$, or exactly $\frac{39}{7} \approx 5.6$ beats per minute.

70.4 and 64.9; difference about 5.6

Exercise 9 - Plant growth

A: mean 23, MAD 2. B: mean 29, MAD 2.

Difference: 6 cm, which is $6 \div 2 \approx 3$ MADs.

Means 23 cm and 29 cm; MAD 2 each; about 3 MADs

Exercise 10 - Outlier

Mean: $135 \div 7 \approx 19.3$.

Median: 15.

The extreme value 45 pulls the mean up, so the median is more typical.

Median 15; mean about 19.3

Exercise 11 - Test scores

Both means are 92.

Ava's distances: 4, 2, 0, 2, 4; $\text{MAD } 12 \div 5 = 2.4$.

Leo's distances: 16, 8, 8, 8, 8; $\text{MAD } 48 \div 5 = 9.6$.

Ava is more consistent (MAD 2.4 vs 9.6)

Ava	Distance	Leo	Distance
88	4	76	16
90	2	84	8
92	0	100	8
94	2	100	8
96	4	100	8

Distances from the mean 92.

Exercise 12 - Two cities

Medians: 18 and 34; difference $34 - 18 = 16$ degrees.

The boxes do not overlap, so City 2 is clearly warmer.

16 degrees; City 2 is warmer

Exercise 13 - Basketball

Red: median 7, range $9 - 4 = 5$.

Blue: median 8, range $12 - 2 = 10$.

Red: 7, 5; Blue: 8, 10

Exercise 14 - Sleep

Both medians are 10 (the middle value of the seven ordered values).

Group 1 range: $11 - 8 = 3$; Group 2 range: $14 - 6 = 8$.

Group 2 is more spread out, so it has more variability.

Both medians are 10; Group 2 has more variability

Exercise 15 - Reading speed

Sofia's class: $700 \div 5 = 140$.

Noah's class: $700 \div 5 = 140$.

The difference is 0.

Both means are 140

Exercise 16 - Quartile comparison

Class 1 IQR: $85 - 70 = 15$. Class 2 IQR: $95 - 65 = 30$.

Class 2 has the greater median and the greater spread

Exercise 17 - Inference

The difference of medians is 30, which is 1.5 times the IQR.

That is a noticeable difference, so eighth graders probably send more messages, though a larger sample would give a stronger conclusion.

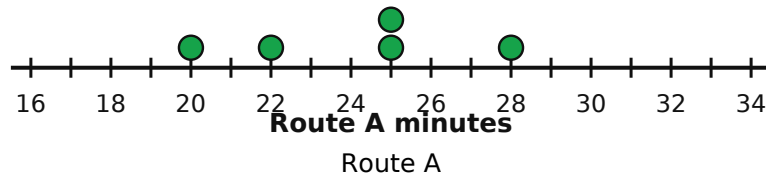
Eighth graders probably send more

Exercise 18 - Bus times

Mean A: $120 \div 5 = 24$. MAD A: $(4 + 2 + 1 + 1 + 4) \div 5 = 2.4$.

Mean B: $130 \div 5 = 26$. MAD B: $(8 + 1 + 1 + 4 + 6) \div 5 = 4$.

Route A: mean 24, MAD 2.4; Route A is more reliable



Exercise 19 - Allowance

Group X: $Q1 = 12$, median = 18, $Q3 = 22$, $IQR\ 22 - 12 = 10$.

Group Y: $Q1 = 15$, median = 18, $Q3 = 21$, $IQR\ 21 - 15 = 6$.

The medians are equal, but Group X is more spread out.

Both medians are \$18; IQR is 10 for X and 6 for Y

Exercise 20 - Heights of grades

$62 - 58 = 4$, and $4 \div 2 = 2$ MADs.

The gap is twice the typical spread, so seventh graders are probably taller on average.

2 MADs; seventh graders are probably taller