

Grade 7 · Comparing Two Populations · Quiz

Common Core 7.SP.B.3, 7.SP.B.4 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This quiz has 10 multiple-choice questions on comparing two populations. Read each dot plot and box plot carefully, compute the MAD when asked, and divide the difference of the centers by the variability. Only one answer is correct in each question.

Grade 7 Common Core: 7.SP.B.3 · 7.SP.B.4

Questions

Question 1

Two random samples have means of 40 and 52. Both MADs are 4. The difference of the means is how many MADs?

- A. 3
- B. 12
- C. 8
- D. 48

Question 2

Use the dot plots of goals scored.

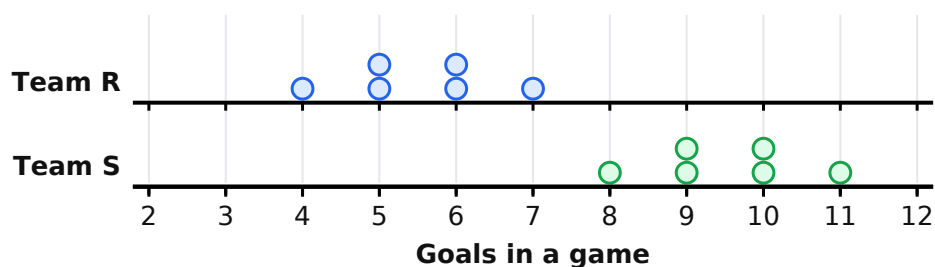


Figure. Goals scored by two teams.

Which statement is correct?

- A. Team R has the greater mean, by 4 goals
- B. Team S has the greater mean, by 2 goals
- C. The two means are equal
- D. Team S has the greater mean, by 4 goals

Question 3

What does the MAD of a data set measure?

- A. The distance from the maximum to the minimum
- B. The middle value of the ordered data
- C. The mean of the distances from the mean
- D. The distance from Q1 to Q3

Question 4

The box plots show water temperatures of two pools.

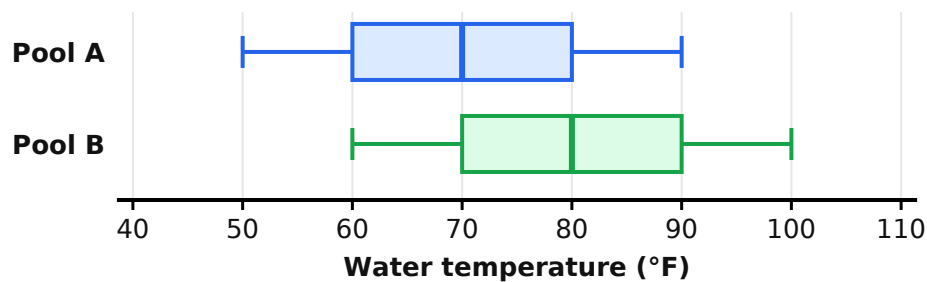


Figure. Temperatures of two pools.

What is the difference of the medians?

- A. 5 °F
- B. 10 °F
- C. 20 °F
- D. 30 °F

Question 5

Why should a sample be random when you compare two populations?

- A. A random sample always has a larger mean than the population
- B. Every member has an equal chance of being chosen, so the sample represents the population
- C. A random sample makes the MAD equal to zero
- D. A random sample proves the populations are equal

Question 6

The dot plots show reaction times of two random samples.

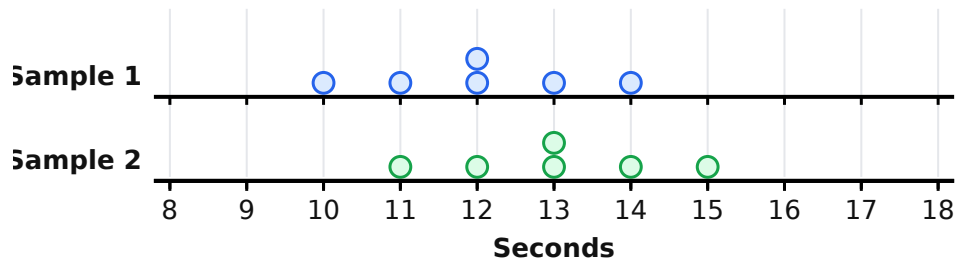


Figure. Two samples of reaction times.

The means are 12 and 13 seconds, and each MAD is about 1 second. What is the best conclusion?

- A. The samples overlap a lot, so Sample 2 is far slower
- B. The samples do not overlap, so the populations differ
- C. The means differ by 12 MADs
- D. The samples overlap a lot, so the populations are similar

Question 7

Find the MAD of the data 2, 4, 6, 8, and 10.

- A. 6
- B. 2.4
- C. 12
- D. 2

Question 8

Sample A has a mean of 7.8 inches and Sample B has a mean of 6.3 inches. Both MADs are 0.5 inch. The means are how many MADs apart?

- A. 1.5
- B. 0.3
- C. 3
- D. 15

Question 9

The means of two samples are 20 units apart, and the difference is 4 MADs. What is the MAD?

- A. 80
- B. 24
- C. 0.2

D. 5

Question 10

Two random samples of students have means of 55 and 59 minutes of sleep, and both MADs are 20 minutes. Which sentence is the best informal inference?

- A. The difference is small compared with the spread, so the populations may be similar
- B. The difference is 4 minutes, so the populations are very different
- C. The difference is 4 MADs, so the populations are very different
- D. Both samples have a MAD, so the populations are identical

Answer key

1. **A** - The difference is $52 - 40 = 12$, and 12 divided by 4 is 3. The mistake is to stop at 12 without dividing by the MAD.
2. **D** - Team R has mean $33 / 6 = 5.5$ and Team S has mean $57 / 6 = 9.5$. The difference is $9.5 - 5.5 = 4$ goals.
3. **C** - MAD stands for mean absolute deviation. The range is maximum minus minimum, the median is the middle value, and the IQR is Q3 minus Q1.
4. **B** - Pool A has a median of 70 and Pool B has a median of 80, so the difference is 10. The IQRs are both 20, so the medians are 0.5 IQR apart.
5. **B** - Random selection avoids a biased sample, so the results support an informal inference. It does not prove anything or change the MAD.
6. **D** - The means differ by only 1 second, which is about 1 MAD, so the dots overlap heavily. The difference is small compared with the spread.
7. **B** - The mean is 6 and the distances are 4, 2, 0, 2, 4. They add to 12, and 12 divided by 5 is 2.4. The mistake is to divide by 2 or to report 12.
8. **C** - The difference is $7.8 - 6.3 = 1.5$ inches, and 1.5 divided by 0.5 is 3. Reporting 1.5 forgets to divide by the MAD.
9. **D** - The MAD is the difference divided by the multiple: 20 divided by 4 is 5. Multiplying 20 by 4 gives 80, which is the wrong operation.
10. **A** - The difference of 4 is only 0.2 MAD, so the distributions overlap heavily. A small gap compared with the spread does not show a real difference.

Remember:

- Compare centers with the mean or median, and spread with the MAD or IQR.
- Difference of the means divided by the MAD tells how many spreads apart the centers are.
- The larger the multiple, the less the two distributions overlap.
- Random samples make informal inferences about the whole populations reasonable.
- Another random sample gives slightly different numbers, so conclusions stay informal.