LESSON MAKER PRO

What Is Typical?

Compare centers, spreads, and outliers in real data

HIGH SCHOOL · GDA.DSP.C

GDA.DSP.C "Distributions of quantitative data (continuous or discrete) in one variable should be described in the context of the data with respect to what is typical (the shape, with appropriate measures of center and variability..."

NAME _____ DATE _____

CENTER AND SPREAD

To find population standard deviation, find the mean, square each value's distance from the mean, average the squares, and take the square root. A high or low outlier can pull the mean away from most values. When that happens, the median may better describe a typical value; use 1.5 times the IQR beyond either quartile to check for outliers.

WORKED EXAMPLE

The dot plot shows cafeteria wait times in minutes. Find the mean and population standard deviation.



1. Mean: (11 + 11 + 15 + 15) / 4 = 13 minutes.
2. Squared distances from 13: 4, 4, 4, 4.
3. Population variance: (4 + 4 + 4 + 4) / 4 = 4.
4. Population standard deviation: $\sqrt{4}$ = 2 minutes.

Answer: The mean wait is 13 minutes, and the population standard deviation is 2 minutes.

PRACTICE 6 problems

1 The dot plot shows how many songs four students saved this week. Find the mean and population standard deviation.

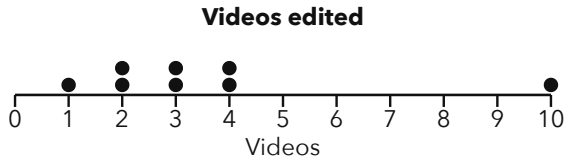


ANSWER _____

2 Four workouts lasted 7, 7, 9, and 9 minutes. What is the population standard deviation?

ANSWER _____

3 The dot plot shows the number of videos eight students edited this month. Find the median and identify any outlier using the 1.5 × IQR rule.



ANSWER _____

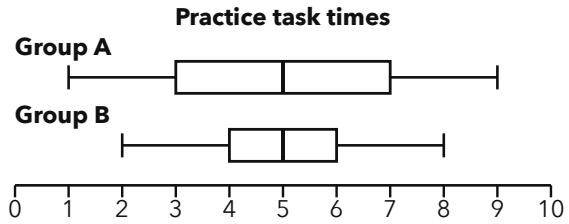
4 For the data in problem 3, is the mean or median a better description of a typical student's number of videos? Explain in one sentence.

ANSWER _____

5 Two groups tracked their daily reading time. Group A recorded 16, 16, 24, and 24 minutes. Group B recorded 18, 18, 22, and 22 minutes. Find each population standard deviation and name the more consistent group.

ANSWER _____

6 The box plots show minutes spent on a practice task by two groups. Which group has the larger IQR, and by how many minutes?



ANSWER _____

APPLY IT Show your work

1 Two bus routes to school each averaged 10 minutes over four trips. Route A took 8, 8, 12, and 12 minutes. Route B took 9, 9, 11, and 11 minutes. Which route was more predictable? Give both population standard deviations to support your choice.

WORK SPACE

ANSWER _____

2 Seven identical game-day posters were listed for $5, $6, $6, $7, $8, $8, and $20. Identify any outlier using the 1.5 × IQR rule. What median price describes a typical listing?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Two gaming groups tracked minutes spent on a daily puzzle. Group A recorded 3, 3, 3, 3, 9, 9, 9, and 9 minutes. Group B recorded 3, 3, 3, 3, 3, 3, 3, and 27 minutes. Both groups have a mean of 6 minutes. Calculate each population variance, then explain which group has the larger population standard deviation despite the shared mean.

WORK SPACE AND ANSWER

What Is Typical?

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The dot plot shows how many songs four students saved this week. Find the mean and population standard deviation.	**Mean: 5 songs. Population standard deviation: 3 songs.**
2	Four workouts lasted 7, 7, 9, and 9 minutes. What is the population standard deviation?	**1 minute.**
3	The dot plot shows the number of videos eight students edited this month. Find the median and identify any outlier using the 1.5 × IQR rule.	**Median: 3 videos. Outlier: 10 videos.**
4	For the data in problem 3, is the mean or median a better description of a typical student's number of videos? Explain in one sentence.	**The median is better because the outlier pulls the mean above most students' values.**
5	Two groups tracked their daily reading time. Group A recorded 16, 16, 24, and 24 minutes. Group B recorded 18, 18, 22, and 22 minutes. Find each population standard deviation and name the more consistent group.	**Group A: 4 minutes. Group B: 2 minutes. Group B is more consistent.**
6	The box plots show minutes spent on a practice task by two groups. Which group has the larger IQR, and by how many minutes?	**Group A has the larger IQR by 2 minutes.**

PART 2 · APPLY IT

1. **Route B was more predictable. Route A's population standard deviation was 2 minutes; Route B's was 1 minute.** Both means are 10 minutes. Route A's squared distances average 4, while Route B's average 1.
2. **$20 is an outlier. The median price is $7.** Q1 is $6 and Q3 is $8, so the IQR is $2 and the upper outlier fence is $11. The middle price is $7.

CHALLENGE

Group A's population variance is 9 minutes squared; Group B's is 63 minutes squared. Group B has the larger population standard deviation because its values have a greater average squared distance from the shared mean of 6 minutes.

Population standard deviation divides by the number of data values, not one fewer. Accept equivalent explanations that identify the outlier's effect on the mean or correctly compare spread.