EUREKA MATH™ TIPS FOR PARENTS

KEY CONCEPT OVERVIEW

In the final topic of the module, students examine data collected from random samples of two different populations to determine whether the difference in means is the result of more than just sampling variability. Students also explore sample means to determine whether there is a difference in population means. The final lesson of the topic requires students to draw informal inferences about the differences between two populations by examining the mean and **mean absolute deviation (MAD)** of random samples of each population.

You can expect to see homework that asks your child to do the following:

- Examine graphs to determine whether the data displayed represent the population.
- Calculate the MAD.
- Determine whether the difference between two means is meaningful (i.e., results from more than just sampling variability).
- Draw a dot plot to represent data collected. (See Sample Problems.)

SAMPLE PROBLEMS *(From Lesson 22)*

The chart below shows how much time had actually passed, in seconds, when students estimated that a minute had passed—first, when the room was quiet and then again when people were talking.

Use the data to complete the following problems:

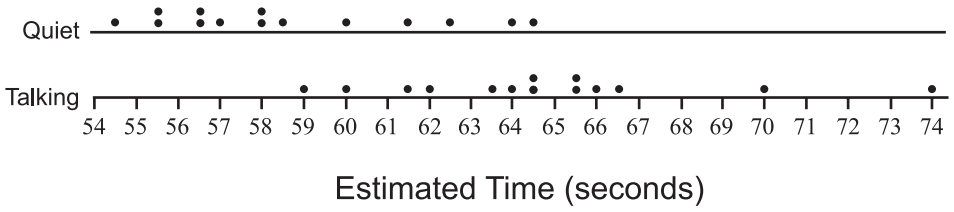
Group	Estimates for a Minute (in seconds)													
Quiet	58.1	56.9	60.1	56.6	56.4	54.7	64.5	62.5	58.6	55.6	61.7	58.0	55.4	63.8
Talking	73.9	59.9	65.8	65.5	64.6	58.8	63.3	70.2	62.1	65.6	61.7	63.9	66.6	64.7

1. Calculate the mean estimates under quiet conditions and when people were talking. Then, find the difference between the talking mean and the quiet mean.

The mean of the quiet estimates is 58.8 seconds.
The mean of the talking estimates is 64.8 seconds.
64.8 − 58.8 = 6
The difference between the two means is 6 seconds.

SAMPLE PROBLEMS *(continued)*

2. On the same scale, draw dot plots of the two data distributions and discuss the similarities and differences in the two distributions.



Answers may vary. The two dot plots have a lot of overlap; the variability in each is about the same. The dot plot for the quiet group appears to be centered around 60 seconds, and the dot plot for the talking group appears to be centered around 65 seconds.

3. Calculate the MAD for each data set. Based on the MADs, compare the variability in each sample. Is the variability about the same? Interpret the MADs in the context of the problem.

The MAD for the quiet distribution is 2.68 seconds.
The MAD for the talking distribution is 2.73 seconds.
The MAD measurements are about the same, indicating that the variability in each data set is similar. In both groups, a typical deviation of students' minute estimates from their respective mean is about 2.7 seconds.

4. Based on your calculations, is the difference in the mean time estimates meaningful?

The number of MADs that separate the two sample means is $\frac{6}{2.73}$, or about 2.2. There is a meaningful difference between the means because the means are separated by more than 2 MADs.

Additional sample problems with detailed answer steps are found in the *Eureka Math Homework Helpers* books. Learn more at GreatMinds.org.

HOW YOU CAN HELP AT HOME

You can help at home in many ways. Here are some tips to help you get started.

- Provide your child with a set of data (e.g., 5, 5, 6, 7, 8, 9, 9), and ask him to calculate the mean and the MAD. (See Terms for how to calculate the MAD.) The mean of the data provided is 7, and the MAD is $1\frac{3}{7}$.
- In preparation for Module 6, review the angle relationships presented in Module 3.

TERMS

Deviation: A deviation is the amount by which a single value in a data set varies from the mean value. For example, if the mean of a data set is 6, the number 9 has a deviation of 3.

Mean absolute deviation (MAD): The mean of all the deviations (distances from the mean) for that data set. For example, if the values in a data set are 2, 7, and 9, the mean is 6. Therefore, the deviations are 4, 1, and 3, respectively. The MAD is $(4 + 1 + 3) \div 3$, or $2\frac{2}{3}$.