# EUREKA MATH™ TIPS FOR PARENTS

KEY CONCEPT OVERVIEW

This topic begins by introducing students to **populations** and **samples**. As students investigate **statistical questions**, they must determine the population and sample for each question. For example, when determining the amount of time seventh graders spend on their homework, the population is all seventh graders, and the sample is a subset (or group) of seventh graders. Later in the topic, students identify **random samples** and understand the **variability** in a sample. Students discover that the size of the sample affects the sampling variability, and they understand that the variability may affect predictions about the **mean** of the population.

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

- Identify **population characteristics** and **sample statistics**.

- Describe how to collect data to answer statistical questions.

- Determine whether a sample was chosen randomly.

- Analyze data from different sample sizes.

- Describe how to choose a random sample.

- Calculate the mean of a sample and compare the means of different samples.

SAMPLE PROBLEMS *(From Lesson 18)*

The question *What is the typical time spent at the gym?* is being investigated by selecting random samples from a population of 800 gym members. Displayed below are two different dot plots of sample means calculated from random samples of the population.
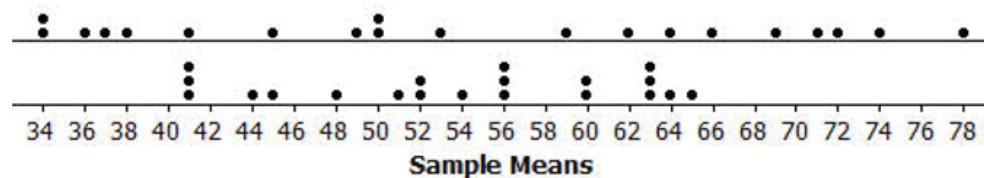
a. Describe one difference between the two dot plots.

Answers may vary. The first dot plot shows a greater variability in the sample means than the second dot plot does because the dots are more spread out.

b. Which dot plot are you more confident using to answer the statistical question? Explain your answer.

The second dot plot gives me more confidence because the sample means do not differ as much. They are more tightly clustered, so I think I have a better idea of where the population mean is located.

SAMPLE PROBLEMS *(continued)*

c. In general, do you want the sampling variability to be large or small? Explain your answer.

The larger the sampling variability (i.e., the more the data are spread out), the further you can expect a sample statistic to be from the population characteristic. Since you want the value of the sample statistic to be close to the population characteristic, you want the sampling variability to be small (i.e., the data should be clustered together).

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.

- Ask your child to identify and explain some situations in which data might be collected from a sample rather than a population. For example, someone who wants to determine the typical number of children in a family living in Colorado would find it almost impossible to gather data from every family in Colorado. Therefore, a researcher is most likely to collect data from a random sample of families.

- Sampling variability is often larger when the sample size is small. Discuss with your child the benefits of a small sampling variability (the sample mean is more likely to be closer to the true value of the population mean) and the ways to decrease the degree of variability when choosing a sample (choose a larger sample).

TERMS

Mean: The average of the values (numbers) in a data set. To calculate the mean, divide the sum of the values by the number of values. For example, if the values in a data set are 2, 7, and 9, the mean is $(2 + 7 + 9) \div 3$, or 6.

Median: The middle value when the values in a data set are ordered from least to greatest. For example, if values in the data set are 2, 3, 6, 7, 8, 10, and 14, the median is 7. If there is an even number of values in the data set, then calculate the mean of the middle two numbers to determine the median of the data set.

Population: An entire collection of people, animals, plants, or things that someone studies, surveys, or polls.

Population characteristic: A mean or median value for an entire population. For example, if the population is all seventh graders at one school, then the median height of the students is one population characteristic.

Random sample: A sample chosen at random, with no predictability. For example, when choosing a sample of seventh graders at a school, placing all seventh-grade students' names in a bag and drawing one name at a time creates a random sample.

Sample: A part of a population.

Sample statistic: A mean or median value for a sample of a population. For example, if the population is all seventh graders at one school, then the median height of students in one seventh-grade classroom is one sample statistic for this population.

Statistical question: A question that can be answered by collecting data and that anticipates variability (different answers) in the data. For example, *How many minutes per day do seventh-grade students spend on math homework?* is a statistical question.

Variability: The extent to which the data values in a set differ from each other; variability occurs when the observations in a data set are not all the same. For example, the variability of the data set {0, 2, 4, 4, 5, 9, 18} is greater than the variability of the data set {2, 3, 3, 3, 3, 3, 4}.