Data Among Us: Homework Examples from ACE

Investigation 1: *What's In a Name? Organizing, Representing and Describing Data,* ACE #6-9
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Investigation 1: *What's In a Name? Organizing, Representing and Describing Data*
ACE #6-9

The U.S. class is also pen pals with a Russian class. For Exercises 6–9, use the bar graph below.

Lengths of Russian Names

6. Which value for name length occurs most frequently? What is this summary statistic called?
7. How many Russian students are in this data set? Explain how you got your answer.
8. What is the range of number of letters in the Russian pen pals' names? Explain how you got your answer.
9. What is the median name length? Explain how you got your answer.

6. 15 letters; mode

7. 30; The bar for each number represents the number of students with that name length, so

adding the bar heights (2+3+5+3+6+5+2+1+2+1) gives the total number of students.

8. The data vary from 11 to 20 letters; the range is 9 letters (20−11=9).

9. 15 letters; There are 30 student name lengths, so the median is between the 15th and 16th

data values, which are both 15.

Investigation 2: *Who's In Your Household? Using the Mean*
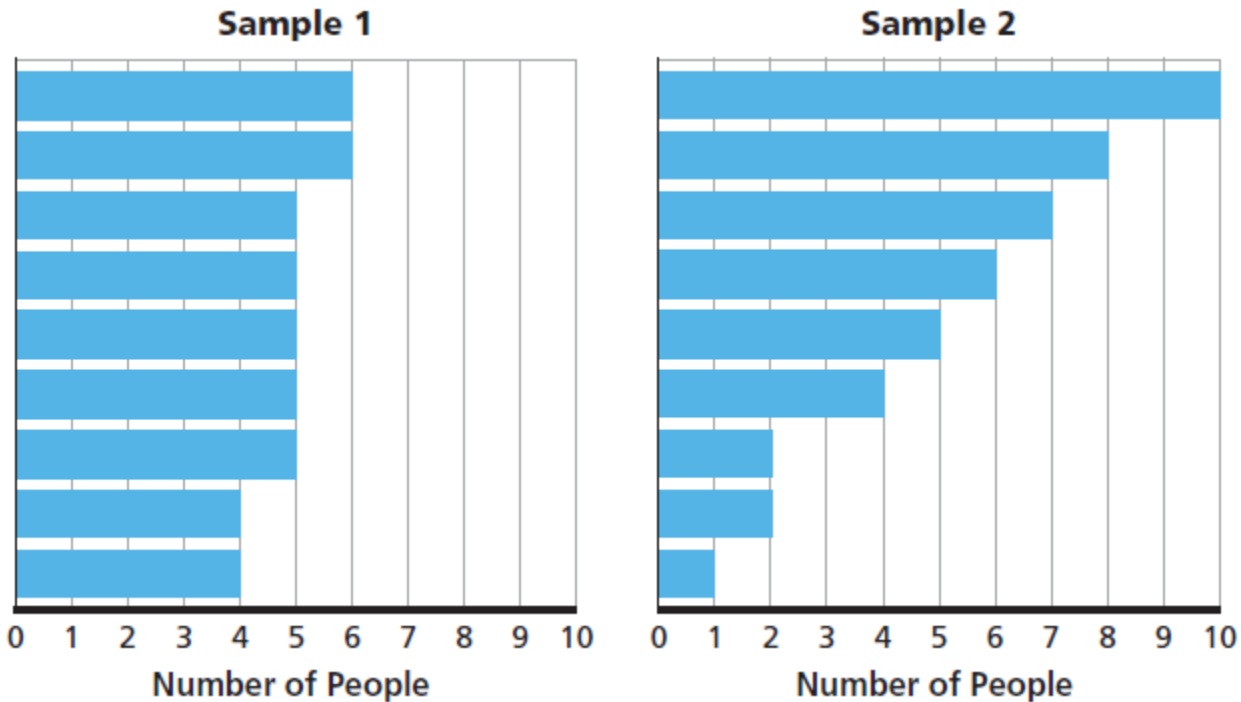ACE #10-16

10. What is your height in centimeters?
11. What is your favorite musical group?
12. In which month were you born?
13. What would you like to do when you graduate from high school?
14. Use your foot as a unit of measure. How many of your "feet" tall are you?
15. What kind(s) of transportation do you use to get to school?
16. On average, how much time do you spend doing homework each day?

10. The answer will be a number, such as 150 cm. Numerical data.
11. The answer will be a name, such as "Hootie and the Blowfish." Categorical data.
12. The answer will be the name of a month, such as "October". Categorical data.
13. The answer will be a set of different occupations, such as "dentist" or "carpenter". Categorical data.
14. The answer will be a number. Numerical data.
15. The answer will be set of different transportation vehicles, such as "car" or "bus". Categorical data.
16. The answer will be a number, such as "2". Numerical data.

Investigation 3: *What's Your Favorite…? Measuring Variability* *ACE #5*

5. Below are two ordered-value bar graphs (Sample 1 and Sample 2), each showing nine households with a mean of five people per household.

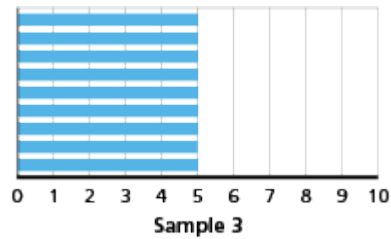**Sample 1**

Sample 2

Number of People

Number of People

a. For each sample, how many *moves* does it take to even out the bars so that the mean is 5? A "move" is the movement of one person from one household to another household.
b. Draw an ordered-value bar graph showing nine households in which each data value is 5. Use the same scale as the other two graphs and label it Sample 3. How does this show that the mean is five people?
c. The closer a data value is to the mean, the fewer moves it takes to even out the data. In which graph (Sample 1, 2, or 3) are the data closest to the mean (vary the least)? Farthest from the mean (vary the most)? Explain.
d. Using the three ordered-value bar graphs, find the mean absolute deviation (MAD) for each set of data. Based on the MADs, which set of data varies the most from the mean of five people? Varies the least? Explain.

a. Sample 1: 2 moves

Sample 2: 11 moves

b. The mean household size is the number that each household would have if the people were distributed so that each household has the same number. The evened-out bar graph shows the households as having an equal number of people,

so it shows the mean.

Sample 3

c. In Sample 3, the data vary the least from the mean; in Sample 2, the data vary the most from the mean. It takes 0 moves to even out the bars of Sample 3; the bars are already evened out. It takes the most moves to even out the bars of Sample 2.
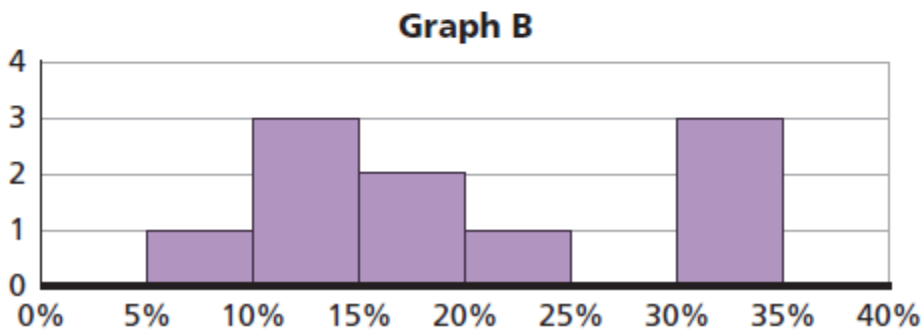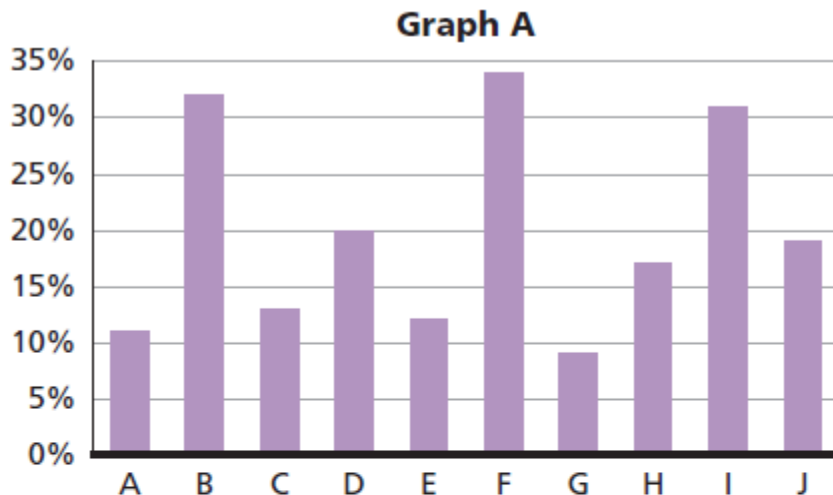
d. MAD Sample 1: 4/9, or 0.44;

MAD Sample 2: 22/9 , 2 4/9, or 2.44;

MAD Sample 3: 0/9, or 0.

Sample 2 varies the most from the mean of 5 people; Sample 3 varies the least from the mean of 5 people. This is because greater MADs indicate that data vary more from the mean. Lesser MADs indicate that data don't vary that much from the mean.

Investigation 4: *What Numbers Describe Us? Using Graphs to Group Data*
ACE #5-9

For Exercises 5–9, use the graphs below. The graphs compare the percent of real juice found in different juice drinks.

Graph A

Graph B

5. a. Which juice drink(s) has the greatest percent of real juice? The least percent of real juice? Which graph did you use to find your answer? Explain why you chose that graph.
b. For each juice you named in part (a), what percent of real juice does the drink contain? Which graph did you use? Explain.
6. a. Which graph can you use to find the percent of real juice found in a typical juice drink? Explain your reasoning.
b. What is the typical percent of real juice? Explain your reasoning.
7. What title and axis labels would be appropriate for Graph A? For Graph B?
8. If you were given only Graph A, would you have enough information to draw Graph B? Explain your reasoning.
9. If you were given only Graph B, would you have enough information to draw Graph A? Explain your reasoning.

5. a. Juice F has the greatest percent of real juice. Juice G has the least percent of real juice. You can use Graph A. Possible explanation: Graph A identifies the individual drinks. If

you use Graph B, you can't identify specific drinks represented in the graph.

b. Juice F has 34% real juice. Juice G has 9% real juice. You can use Graph A. It is the only graph in which you can identify exactly which juice has exactly what percent of real juice in it.

6. a. Possible answer: Graph A; you can even out the bars in the bar graph until all the bars are even. This would give you the mean. Alternatively, you can find the median by listing the data values in numerical order. Find the data value with the middle position; this is the median. Graph B is a histogram. You can only determine how many occurrences there are for intervals of data values. There is no way to determine exact data values. Because of this, you cannot find any exact measures of center, and therefore, it is difficult to find the typical percent of real juice in a juice drink.

b. Possible answers: 19.8% (mean); 18% (median)

7. Possible answers:

Graph A: The title could be Percentage of Real Juice in Juice Drinks. The horizontal axis could be labeled Juice Drinks and the vertical axis could be labeled Percent of Real Juice.

Graph B: The title could be Percent of Real Juice in a Sample of Juice Drinks. The horizontal axis could be labeled Percent of Real Juice and the vertical axis could be labeled Number of Juice Drinks.

8. Yes; from Graph A, you can count how many juice drinks have a percent of juice in each interval to make Graph B.

9. No; the specific data values cannot be identified from Graph B; to make Graph A, you need detailed information.