Identifying Populations and Samples

Use the scenario to identifying populations and samplings.

1) A beverage company wanted to see if people in the United States liked their new logo.
   Which choice **best** represents a population?
   A. A selection of logo artists.
   B. Every person in the United States.
   C. A selection of shoppers from different states.
   D. 3,800 children age 5 - 15

2) A musician wanted to see what people who bought his last album thought about the songs.
   Which choice **best** represents a sample?
   A. Every person who bought the album.
   B. A selection of people who didn't want to buy the album.
   C. 250 girls who bought the album.
   D. A selection of 3,294 people who bought the album.

3) A gaming website wanted to find out which console its visitors owned.
   Which choice **best** represents a population?
   A. Visitors to the 3DS section.
   B. All of the website visitors.
   C. Visitors to the PS4 section.
   D. Visitors who are on the website for more than 5 minutes.

4) Before a nation wide election, a polling place was trying to see who would win.
   Which choice **best** represents a sample?
   A. A selection of voters over age 50.
   B. A selection of male voters.
   C. A selection of voters of different ages.
   D. All voters.

5) A toy store owner tracking how much kids spend each month on toys.
   Which choice **best** represents a population?
   A. All of the kids who buy toys.
   B. 227 rich kids.
   C. 228 boys age 7 - 15
   D. 235 kids from age 10 to 15.

6) A mayor wanted to see if the people in his town thought he was doing a good job.
   Which choice **best** represents a sample?
   A. 1,000 unemployed voters.
   B. The mayor's family.
   C. The residents' family.
   D. 242 voters.
I. What method could he use to estimate the number of trees of each type? Explain your method fully.

II. On your worksheet, use your method to estimate the number of:
(a) Old trees
(b) Young trees
A group of friends are planning to sell candy bars at the school shop. They conduct a small survey among 30 people, asking the question: How many candy bars do you eat in a typical week? Here are their results:

Chris says: "We have found that the total number of bars eaten by all the males is 183, and the total number eaten by all the females is 92. In general, this means that men eat more candy than women."

(a) Is Chris correct in his reasoning?

(b) Write down one conclusion (comparing males and females) that is supported by the data. Show any work you do.
7.4 Homework
1. A psychology researcher posts an advertisement offering $20 in exchange for participation in a short study. The researcher accepts the first ten people who respond to the advertisement. Is this a good way to choose the sample? Why or why not?

2. Ms. Gorden decides that she is going to call a sample of her students to see if they feel ready for the upcoming test. Ms. Gorden writes all of their names on slips of paper, throws the papers in the air, and grabs a few pieces of paper as they flutter to the ground. Is this a good way to choose the sample? Why or why not?

3. A reporter from the local news is running a story on a hometown band. The reporter goes to the concert hall before the show and interviews the first ten people to arrive. Is this a good way to choose the sample? Why or why not?

4. Below is the data collected from two random samples of 500 American adults on their hours of sleep per night (rounded to the nearest hour). What inferences would you draw about American adults’ sleep habits as a whole?

<table>
<thead>
<tr>
<th>Hours</th>
<th>Sample 1</th>
<th>Sample 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Five</td>
<td>15</td>
<td>10</td>
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<tr>
<td>Six</td>
<td>80</td>
<td>78</td>
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<tr>
<td>Seven</td>
<td>250</td>
<td>282</td>
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<tr>
<td>Eight</td>
<td>100</td>
<td>90</td>
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<tr>
<td>Nine</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>Ten</td>
<td>5</td>
<td>10</td>
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</tbody>
</table>

5. Ms. Gorden has not had the time to grade every students’ test, but she wants to get a general sense of how her students did. Ms. Gorden shuffles her papers, picks 10 papers at random and grades them, yielding the results below. What inferences would you draw about the performance of Ms. Gorden’s students?

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>2</td>
<td>1</td>
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</tbody>
</table>
7.5 Homework
1. Would any of the following provide a random sample of letters used in the text of the book *Harry Potter and the Sorcerer’s Stone* by J.K. Rowling? Explain your reasoning.
   a. Use the first letter of every word of a randomly chosen paragraph.

   b. Number all of the letters in the words in a paragraph of the book, cut out the numbers, and put them in a bag. Then, choose a random set of numbers from the bag to identify which letters you will use.

   c. Have a family member or friend write down a list of his favorite words, and count the number of times each of the letters occurs.

2. Indicate whether the following are random samples from the given population, and explain why or why not.
   a. Population: All students in school; the sample includes every fifth student in the hall outside of class.

   b. Population: Students in your class; the sample consists of students who have the letter s in their last names.

   c. Population: Students in your class; the sample is selected by putting their names in a hat and drawing the sample from the hat.

   d. Population: People in your neighborhood; the sample includes those outside in the neighborhood at 6:00 p.m.

   e. Population: Everyone in a room; the sample is selected by having everyone toss a coin, and those that result in heads are the sample.
7.5 Homework

3. Consider the two sample distributions of the number of letters in randomly selected words shown below:

Do you think the two samples came from the same poem? Why or why not?
7.6 Homework
1. Find the measures of central tendency for the Terra Nova math scores from both classes
   (please use a calculator for mean. Please show work for median):
   a. Mr. Jordan
      i. Mean
      ii. Median
      iii. Mode

b. Mr. Krevalis
   i. Mean
   ii. Median
   iii. Mode

<table>
<thead>
<tr>
<th>Jordan</th>
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<thead>
<tr>
<th>Krevalis</th>
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<td>58</td>
<td>82</td>
<td>66</td>
<td>70</td>
<td>83</td>
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<td>87</td>
<td>84</td>
<td>79</td>
<td>76</td>
<td>69</td>
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</tbody>
</table>
7.7 Homework
1. Gabriela took a random sample of eight seventh graders and measured their heights.
   a. 59, 58, 61, 74, 59, 57, 60, 56
2. Isabella took a different random sample of eight seventh graders.
   a. 58, 61, 55, 60, 56, 60, 59, 57

Please find the measures of central tendency for each random sample.

Gabriela
   i. Mean
   
   ii. Median
   
   iii. Mode

b. Isabella
   i. Mean
   
   ii. Median
   
   iii. Mode

Which random sample is a better representation of the population? Why?
7.8 Homework
Huey, Dewey, and Louie all took a survey (sample) of ten seventh graders. They asked each student how much money they had on them.

For each sample, please find the measures of center and sketch a rough dot plot.

Huey: 11, 5, 2, 5, 8, 4, 10, 5, 4, 6

Mean

Median

Dewey: 9, 0, 14, 1, 10, 0, 2, 11, 12, 1

Mean

Median

Louie: 4, 5, 8, 2, 461, 5, 4, 6, 5, 10

Mean

Median

Does Huey, Dewey, or Louie have better measures of center? Why?
7.9 Homework

A Tale of Two Companies

Determine the Center (Mean) and the Variability (Range) for the salaries at two companies. Sketch a rough dot plot.

Company A:

$28,000; $30,000; $50,000; $30,000; $29,000; $33,000; $40,000; $29,000; $30,000; $31,000

Mean

Range

Company B:

$22,000; $26,000; $20,000; $28,000; $21,000; $25,000; $24,000; $23,000; $27,000; $114,000

Mean

Range

Compare the two companies:
____________________________________________________________________________________________________________________
____________________________________________________________________________________________________________________
__________________________________________________________________________________________________
____________________________________________________________________________________________________________________
A Tale of Two Classes

Determine the Center (Mean & Median) and the Variability (Range & IQR) for the quiz results from two classes. Sketch a rough dot plot.

Class A: 2, 10, 7, 4, 10, 7, 2, 10, 7, 2, 10, 4, 10, 10, 10

<table>
<thead>
<tr>
<th>Center</th>
<th>Variability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean:</td>
<td>Range:</td>
</tr>
<tr>
<td>Median:</td>
<td>IQR:</td>
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</table>

Class B: 7, 2, 7, 7, 7, 7, 7, 9, 7, 7, 10, 7, 7, 7, 7

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<tr>
<td>Mean:</td>
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<tr>
<td>Median:</td>
<td>IQR:</td>
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</table>

Compare the two classes:

______________________________________________________________________________________________________________________
______________________________________________________________________________________________________________________
______________________________________________________________________________________________________________________
1. Suppose the dot plot on the left shows the number of goals a boys’ soccer team has scored in six games so far this season, and the dot plot on the right shows the number of goals a girls’ soccer team has scored in six games so far this season. The mean for both of these teams is 3.

a. Before doing any calculations, which dot plot has the larger MAD? Explain how you know.

b. Now calculate the MAD for both teams.
   
i. Boys:

ii. Girls:

C. Based on the computed MAD values, for which distribution is the mean a better indication of a typical value? Explain your answer.
Measures of Central Tendency

<table>
<thead>
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<th>Range:</th>
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<tbody>
<tr>
<td>Median:</td>
<td>Inter-Quartile Range (IQR):</td>
</tr>
<tr>
<td>Mode:</td>
<td>Mean Absolute Deviation (MAD):</td>
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*******Next Page →
### Measures of Central Tendency

- **Mean:**
- **Median:**
- **Mode:**

### Measures of Variability

- **Range:**
- **Inter-Quartile Range (IQR):**
- **Mean Absolute Deviation (MAD):**

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</tr>
<tr>
<td>Mode:</td>
<td>Mean Absolute Deviation (MAD):</td>
</tr>
</tbody>
</table>
7.13 Homework
Mr. Jordan needs to know the statistics on the following set of numbers:

50, 36, 78, 106, 215, 1, 6, 8, 75, 64, 83, 199, 99, 48, 32, 24, 48, 64, 68, 60, 75, 82, 88, 87, 78, 95, 59, 62, 26, 43, 34, 57, 71, 19, 96, 64, 48, 82, 23, 33, 44, 55, 66, 77, 88, 99, 109, 108, 65, 78, 59, 59, 54, 26, 65, 88, 82, 84, 3, 8, 9, 7, 6, 166, 144, 133, 208, 301, 32, 76, 90, 34, 65, 48, 34, 78, 24, 66, 69, 90, 5, 84, 7, 64, 215, 9, 11, 51, 64, 85, 37, 46, 198, 6, 87, 64, 85, 32, 197, 70

This is a very large set of numbers. It would take a VERY LONG TIME to determine the measures of center and variability. Therefore, let’s take a random sample of this set of numbers. Please make sure that your sample is random (pick every fifth number, or every ninth number, or every eleventh number, etc.) Your sample should have at least 15 numbers, and no more than 25.

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<tbody>
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<td>Median:</td>
<td>Inter-Quartile Range (IQR):</td>
</tr>
<tr>
<td>Mode:</td>
<td>Mean Absolute Deviation (MAD):</td>
</tr>
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</table>
Directions: Solve the following problems by finding the mean, median, range, or mean absolute deviation (MAD). You may use a calculator, but you must show your work!

1. \{13, 15, 9, 35, 25\}
   Mean = 
   MAD = 
   Range = 

2. \{6, 1, 3, 8, 5, 11, 1, 5\}
   Mean = 
   MAD = 
   Range = 

3. Jason and Jill are two students in Mr. White's math class. On the last five quizzes, Jason scored an 80, 90, 95, 85, and 70. Jill scored a 70, 75, 90, 100, and 95. Find the mean and mean absolute deviation for each student.
   Jason's Mean = 
   Jill's Mean = 
   Jason's MAD = 
   Jill's MAD = 

Who has a better quiz average? 
Who has more consistent grades?
4. The Smith and Jones families each have six family members. They wanted to compare the differences in ages between the two families. The ages of the members of Smith family are 45, 43, 13, 11, 5, and 2, while the Jones family members are 45, 39, 17, 16, 4, and 1. Find the mean absolute deviation and range in ages for each family.

Smith Family MAD = ________
Jones Family MAD = ________

Smith Family Range = ________
Jones Family Range = ________

Which family has the greatest difference in ages? ________________

5. Sherry has an after-school job at Papa John’s. Her boss keeps track of how many pizzas she sells each day. During her last five days of work, she served 29, 58, 15, 75, and 22 pizzas.

What was the median number of pizzas Sherry sold? ________
What was the mean absolute deviation of the pizzas she sold? ________
7.15 Homework

Below are three dot plots. Each dot plot represents the differences in sample means for random samples selected from two populations (Bag A and Bag B). For each distribution, the differences were found by subtracting the sample means of Bag B from the sample means of Bag A (sample mean A − sample mean B).

1. Does the graph below indicate that the population mean of Bag A is larger than the population mean of Bag B? Why or why not?

2. Does the graph below indicate that the population mean of Bag A is larger than the population mean of Bag B? Why or why not?

3. Does the graph below indicate that the population mean of Bag A is larger than the population mean of Bag B? Why or why not?