Assignment

Name _____ Date _____

Taking the PSAT
Measures of Central Tendency

Define each term in your own words.

1. mean

2. median

3. mode

The data below show the test scores for a ninth grade Algebra class. Jessica received a score of 71% on the test. She wants to analyze the data to see how her score compares to the scores of the rest of the students in the class.

Ninth grade Algebra test scores: 61, 55, 71, 84, 58, 93, 82, 91, 47, 88, 84, 65, 46, 61, 84, 55, 69, 67, 73, 63, 37, 67, 72, 75, 73, 74, 95, 82, 73, 71

4. Create a stem-and-leaf plot of the data.

3	[ ]
4	[ ]
5	[ ]
6	[ ]
7	[ ]
8	[ ]
9	[ ]

7 | 1 = _____

5. What information about the data set can easily be seen after creating the stem-and-leaf plot? Use complete sentences in your answer.

6. Describe the distribution of the data. Use a complete sentence in your answer

7. Analyze the data by finding the mean, median, and mode of the test scores. Use complete sentences in your answer.

8. Describe how Jessica's score compares to the scores of the rest of the students in the class. Use a complete sentence in your answer.

9. Describe a real-life data set for which the median is a much better representation of the data set than the mean. Use complete sentences in your answer.

Assignment

Name _____   Date _____

Data Analysis
How Many People?
Population Data and Samples

The table below shows the populations of the 50 states in the U.S. in 2008.

State	Population (est,. 2008)
California	36,756,666
Texas	24,326,974
New York	19,490,297
Florida	18,328,340
Illinois	12,901,563
Pennsylvania	12,448,279
Ohio	11,485,910
Michigan	10,003,422
Georgia	9,685,744
North Carolina	9,222,414
New Jersey	8,682,661
Virginia	7,769,089
Washington	6,549,224
Arizona	6,500,180
Massachusetts	6,497,967
Indiana	6,376,792
Tennessee	6,214,888
Missouri	5,911,605
Maryland	5,633,597
Wisconsin	5,627,967
Minnesota	5,220,393
Colorado	4,939,456
Alabama	4,661,900
South Carolina	4,479,800
Louisiana	4,410,796
Kentucky	4,269,245
Oregon	3,790,060
Oklahoma	3,642,361

State	Population (est,. 2008)
Connecticut	3,501,252
Iowa	3,002,555
Mississippi	2,938,618
Arkansas	2,855,390
Kansas	2,802,134
Utah	2,736,424
Nevada	2,600,167
New Mexico	1,984,356
West Virginia	1,814,468
Nebraska	1,783,432
Idaho	1,523,816
Maine	1,316,456
New Hampshire	1,315,809
Hawaii	1,288,198
Rhode Island	1,050,788
Montana	967,440
Delaware	873,092
South Dakota	804,194
Alaska	686,293
North Dakota	641,481
Vermont	621,270
Wyoming	532,668

Use the sample below to answer Questions 1 through 6.

State	Population	Absolute deviation from mean	Absolute deviation from median
Texas	24,326,974		
Pennsylvania	12,448,279		
New Jersey	8,682,661		
Indiana	6,376,792		
Minnesota	5,220,393		
Kentucky	4,269,245		
Mississippi	2,938,618		
New Mexico	1,984,356		
New Hampshire	1,315,809		
South Dakota	804,194		

1. Which state in the sample has the largest population? The smallest population?

2. How many states in the sample have populations over 3,000,000? Under 2,000,000?

3. Calculate each measure of central tendency for the sample. Show your work.

    a. Mean

    b. Median

    c. Mode

4. Determine each quartile for the sample.

    a. First quartile

    b. Third quartile

5. Graph a box-and-whisker plot for the sample.

4,744,819

12,448,279   24,326,974

804,194

1,984,356   8,682,661

0   4,000,000   10,000,000   16,000,000   22,000,000
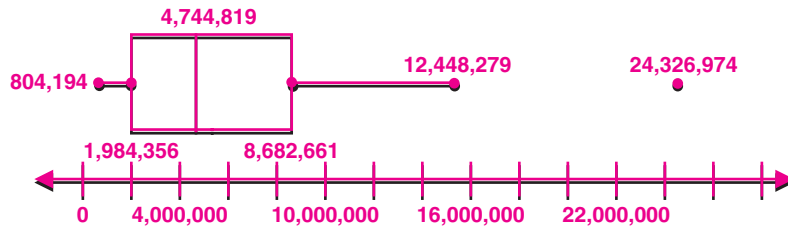
6. For each data value in the sample, calculate the absolute deviation from the mean. Enter the results in the third column of the table above.

7. What is the average absolute deviation from the mean?

8. For each data value in the sample, calculate the absolute deviation from the median. Enter the results in the fourth column of the table above.

9. What is the average absolute deviation from the median?

10. Based on your calculations, what can you conclude about the population of the states in the United States?

11. Decide on a criterion for choosing a sample of states. Then choose 10 different states using the criterion. List the states and their populations in the table below. Explain the criterion that you used.

State	Population

12. Calculate each measure of central tendency for your sample. Show your work.

a. Mean

b. Median

c. Mode (If there is no mode, explain why not.)

13. Determine each quartile for your sample.

a. First quartile

b. Third quartile

14. Graph a box-and-whisker plot for your sample.

15. Compare the box-and-whisker plots from Questions 5 and 14. What are the similarities? What are the differences?

Assignment

8

Name _____   Date _____

Data Analysis
Let's Compare!
Population and Sample Means

The table below shows the 25 cities in Georgia with the highest elevations.

<<Source: http://www.maps-n-stats.com/us_ga_elevation.html.>>

City/town	Elevation (in feet)
Sky Valley	3410
Hartwell	3280
Mountain City	2168
Dillard	2144
Hiawassee	1980
Tiger	1963
Young Harris	1929
Clayton	1925
Blairsville	1893
Morganton	1807
Blue Ridge	1722
Lookout Mountain	1700
Cleveland	1570
Mount Airy	1560
Baldwin	1540
Tallulah Falls	1520
Cornelia	1500
McCaysville	1487
Jasper	1480
Dahlonega	1454
Helen	1440
Clarkesville	1430
Bremen	1424
Raoul	1420
Clermont	1410

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The table below shows a sample of six of the cities from the table above. Use the sample to answer Questions 1 through 4.

City/town	Elevation (in feet)
Sky Valley	3410
Hartwell	3280
Mountain City	2168
Dillard	2144
Hiawassee	1980
Tiger	1963

1. Do you think that the six cities in the sample are a random sample of the 25 cities in Georgia with the highest elevations? Explain your answer.

2. Calculate the mean of the sample. Show your work.

3. The mean of the entire data set is approximately 1806.24. How does the mean of the sample compare to the mean of the entire data set? Why do you think this is?

4. Suppose you want to choose a random sample from the table of the 25 cities in Georgia with the highest elevations.

   a. What is the probability of choosing each city?

b. Describe two ways you could pick a random sample of cities.

5. Use the random number generator function on your calculator to complete the table below for a random sample of six cities from the original data set.

Sample Number	Mean	Sample Number	Mean

The table below shows a sample of six of the cities from the original table of 25 cities. Use the information in the table to answer Questions 6 through 8.

City/Town	Elevation (in feet)
Sky Valley	3410
Hiawassee	1980
Blairsville	1893
Cleveland	1570
Cornelia	1500
Helen	1440

6. Do you think that the six cities in the sample are representative of the 25 cities in Georgia with the highest elevations? Explain your answer.

7. Calculate the mean of the sample. Show your work.

8. Compare the mean of the entire data set, 1806.24, to the mean of this sample. How would you explain any difference between the two values?

Assignment

Name _____   Date _____

Data Analysis
An Experiment of Your Own

Collecting and Analyzing Sample Data

1. Suppose that you collected the following data. The data show the numbers of pets owned by ten randomly selected students from your school.

Sample number	1	2	3	4	5	6	7	8	9	10
Number of pets	0	3	2	0	2	5	1	2	0	5

a. Calculate the mean of your sample data.

b. Based on your sample and your sample mean, what can you predict about the population from which the sample was taken?

2. One of your friends collected her own data by randomly selecting ten students from your school. Your sample and her sample are shown in the table below to form a small group sample.

Sample Number	Number of Pets	Sample Number	Number of Pets
1	0	11	4
2	3	12	2
3	2	13	0
4	0	14	1
5	2	15	4
6	5	16	1
7	1	17	2
8	2	18	1
9	0	19	3
10	5	20	0

a. Calculate the mean of the small group sample.

b. Based on this small group sample and the small group sample mean, what can you predict about the population from which the sample was taken?

c. Compare your sample mean in Question 1 with the small group sample mean.

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3. Two more of your friends collected their own data by each randomly selecting ten students from your school. All four samples are shown in the table below to form a large group sample.

Sample Number	Number of Pets	Sample Number	Number of Pets	Sample Number	Number of Pets	Sample Number	Number of Pets
1	0	11	4	21	2	31	3
2	3	12	2	22	1	32	2
3	2	13	0	23	3	33	0
4	0	14	1	24	2	34	4
5	2	15	4	25	0	35	1
6	5	16	1	26	4	36	0
7	1	17	2	27	0	37	2
8	2	18	1	28	1	38	1
9	0	19	3	29	2	39	4
10	5	20	0	30	0	40	0

a. Calculate the mean of the large group sample.

b. Based on the large group sample and the large group sample mean, what can you predict about the population from which the sample was taken?

c. Compare your sample mean in Question 1 with the large group sample mean.

4. Create a random sample of size ten from the large group sample. Enter this random sample in the table below.

Sample Number	1	2	3	4	5	6	7	8	9	10
Number of Pets										

a. Calculate the mean of the random sample.

b. Based on the random sample and the random sample mean, what can you predict about the population from which the sample was taken?

c. Compare your sample mean and the random sample mean.

d. Compare the large group sample mean and the random sample mean.

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5. Of the four samples—your sample, the small group sample, the larger group sample, and the random sample—which do you think would provide the best information about the population? Which do you think would provide the worst information about the population? Explain.

6. Suppose the actual mean of the entire population is 1.73. Compare all of your sample means to the population mean. How well does each sample mean represent the population? Why?

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