Statistics Support Activity: Introduction to the Mean Average

Notes about the Mean Average $(\bar{x})$:

- A sample mean is usually represented with the symbol " $\bar{x}$ " (x-bar).
- Measure of center or average that balances the distances between the numbers in the data above the mean and below the mean.
- The mean is the most common average or center for the data.
- The mean is only accurate if the data is bell shaped (normally distributed).
- Do not use the mean as your average if the data has a skewed or non-normal shape.
- For larger data sets, it is best to have a statistics software compute the mean.
- The mean is calculated by adding the numbers in the data set $(\sum x)$ and then dividing the sum by how many numbers are in the data set (sample size or total frequency) "n".
- Mean Average Formula: $\bar{x} = \frac{\sum x}{n}$

Problems

1.

Look at the following dollar amounts spent on gas for one trip to the gas station.

60 , 64, 66, 70, 72, 73, 79, 80, 85, 91

a) How many numbers are in the data? (This is called the sample size "n".)

b) Add up all of the numbers in the data set. This is represented by " $\sum x$ " (sum of x values).

c) Divide your answer for letter "b" by the answer for letter "a" to calculate the sample mean average. $\bar{x} = \frac{\sum x}{n} = ?$

d) The mean is defined as measure of center or average that balances the distances. We will now try to verify this is true for this data. Here are the numbers in the data that are smaller than the sample mean. Subtract the mean minus each number to tell how far the number is from the mean. Then add the differences to tell the total distance of all the numbers below the mean.

#'s in data smaller than the mean	How far is this number from the mean?
60	
64	
66	
70	
72	
73	
	Total distance #'s below the mean =

Statistics Support Activity: Introduction to the Mean Average

e) Here are the numbers in the data that are larger than the sample mean. Subtract each number minus the mean to tell how far each number is from the mean.

#'s in data smaller than the mean	How far is this number from the mean?
79	
80	
85	
91	
	Total distance #'s above the mean =

f) What do you notice about the total distance for all the numbers below the mean verses the total distance for all of the numbers above the mean? Does the phrase balancing the distances make more sense now?

2.

Look at the heights in inches of the following sample of men. We also included the height of NBA basketball player Victor Wembanyama who is 7 ft. 4 in (88 inches).

67, 68, 68, 69, 69, 70, 70, 71, 88

a) Calculate the sample mean average height. Round the answer to one more decimal place to the right than is present in the data. Since the numbers in the data all ended at the ones place, you should round your sample mean average to the tenths place (one number to the right of the decimal).

b) Do you think the sample mean you calculated is a good representation of the average typical height of these men? Why or why not?

c) Victor's height is an unusually tall height compared to the rest of the men in the data and makes the data skewed to the right. Do you understand now why we prefer <u>not</u> to use the mean average when the data is skewed?