

MEASURES OF CENTRAL TENDENCY

When discussing central tendency, we are more specifically talking about the mean, median, and mode of a list of values.

MEAN:

The mean is the average of a list of given values, generally expressed by the formula:

$$\bar{x} = \frac{\sum x_i}{n}$$

Where x_i represents each value and n is the number of values in the list being summed.

It's not uncommon for one to look at the average of a list of numbers as a way of smoothing over the variations in the data and obtaining one single representative value. The problem is that this is a valid process only if the data generally follows a normal distribution. Otherwise, there are other measurements that must be referenced to fully understand what is going on with the given data.

MEDIAN:

The median is the number, value, where there are as many observations above as there are below the number. The median allows a person to eliminate or reduce the skewing effect created by observations that are extremely high or extremely low.

MODE:

The mode is the most frequently seen observation in a list of values. It serves as a useful measure because it tells us what value is the one most likely to be observed.

CONCEPT INTRODUCTION

It's important to note that the mean, median, and mode of a normally distributed set of data will be the same. If a truly symmetrical bell shaped curve is obtained, then there will be as many numbers above the average as there are below. This means that the average and median must be the same and both of these numbers will be found at the peak of the curve making them the same as the mode.

If on the other hand, the data is skewed or distorted, the mean, median, and mode will not be the same and we must consider the effect of the skewed data.

Concept Example:

The following problem introduces the concept reviewed within this module. Use this content as a primer for the subsequent material.

The low temperatures for a period of 7 days in a large US city were measured as:

$$29^{\circ}, 31^{\circ}, 28^{\circ}, 32^{\circ}, 29^{\circ}, 27^{\circ}, 55^{\circ}$$

Determine the mean low temperature for this specific period.

Solution:

Recall that the mean is the average of a list of given values, expressed by the formula:

$$\bar{x} = \frac{\sum x_i}{n}$$

Where x_i represents each value and n is the number of values in the list being summed.

The values given in this case are 29, 31, 28, 32, 29, 27, and 55

Summing these values we get:

$$\sum x_i = 231$$

And there are $n=7$ measurements, therefore the mean is:

$$\bar{x} = \frac{231}{7} = 33$$

The mean low temperature for this period was 33°