

Math 311

Mean, Median, Mode, Standard Deviation

Measures of Center:

Mean (\bar{X}) is an algebraic average of your data. The Mean is easily affected by extreme outlier values. Sum (Σ) up the data (x_i) and divide by the number (n) of data elements.

$$\text{Mean} = \frac{1}{n} \sum_{i=1}^n x_i$$

Median is a physical center of the data when organized sequentially. If your data is fairly close in value with no extreme outliers, then the Mean and Median will be somewhat close. Median is not affected by extreme outliers.

Mode is a count of the data points which occur most often. Mode may show that your data has more than one grouping (bimodal), indicating that your data may be affected by some external bias.

Standard Deviation (s_x) is a measure of spread of the data. The larger the deviation, the greater the spread of data.

$$S_x = \sqrt{\left[\frac{1}{n} \sum [(x_i - \bar{X})^2] \right]}$$

- 1) Find the mean
- 2) Find $(x - \bar{X})$ for each x
- 3) Square $(x_i - \bar{X})$ for each value = $(x_i - \bar{X})^2$
- 4) Sum up the squares $\Sigma[(x_i - \bar{X})^2]$
- 5) Divide the sum of the squares by the number of data elements (n) $\left[\frac{1}{n} \Sigma(x_i - \bar{X})^2 \right]$
- 6) Take the square root of the total in step 5. $\sqrt{\left[\frac{1}{n} \Sigma[(x_i - \bar{X})^2] \right]}$

x_i	$(x_i - \bar{X})$	$(x_i - \bar{X})^2$	$\frac{\Sigma(x_i - \bar{X})^2}{n}$	$\sqrt{\left[\frac{1}{n} \Sigma(x_i - \bar{X})^2 \right]}$
4.7	4.7-6.8= -2.1	4.41		
6.8	6.8-6.8= 0	0		
7.2	7.2-6.8= .4	.16		
8.5	8.5-6.8= 1.7	2.89		
$\frac{\Sigma x_i = 27.2}{4}$	$\bar{X} = \frac{\Sigma x_i}{n} = \frac{27.2}{4} = 6.8$	$\Sigma = 7.46$	1.865	1.365

$$S_x = 1.37$$