12-6 Statistical Measures

Add up
÷
divide
by
how many
there are

Univariable Data: Data with one variable.
Measure of Central Tendency: Represents the center or middle of the data.
Mean: Use when the data are spread out, and you want an average of the values.
Median: Use when the data contain outliers. – put #'s in order
& find the middle number
Mode: Use when the data are tightly clustered around one or two values.
⟶ Most Frequent occurring #.

Ex1. A sweepstakes offers a first prize of $10,000, two-second prizes of $100, and one hundred third prizes of $10.

a. Which measure of central tendency best represents the available prizes?

Mode, since there 100 prizes worth $10 and only 3 other prizes worth more.

b. Which measure of central tendency would the organizers of the sweepstakes be most likely to use in their advertising?

Mode: $10
Median: $10
Mean: $108.74

The organizers would use the mean since that is more money & would attract more participants.

$$\frac{10(100) + 2(100) + 10,000}{103} \approx \$108.74$$

Ex2. A new Internet company has 3 employees who are paid $300,000, 10 who are paid $100,000, and 60 who are paid $50,000.

a. Which measure of central tendency best represents the pay at this company?

Median or Mode since both of these give you $50,000 and that salary would most likely be the one.

b. Which measure of central tendency would recruiters for this company be most likely to use to attract job applicants?

Mean : $67,123

$$\frac{50,000(60) + 100,000(10) + 300,000(3)}{73} \approx \$67,123$$

They would choose the mean since that salary is the highest and would attract the best/brightest.

Measures of variation or dispersion measure how spread out or scattered a set of data is. The simplest measure of variation to calculate is the range, the difference between the greatest and least values in a set of data. Variance and standard deviation are measures of variation that indicate how much the data values differ from the mean.

To find the variance of data, follow these steps.
1. Find the mean
2. Find the difference between each value in the set of data and the mean.
3. Square each difference.
4. Find the mean of the squares.
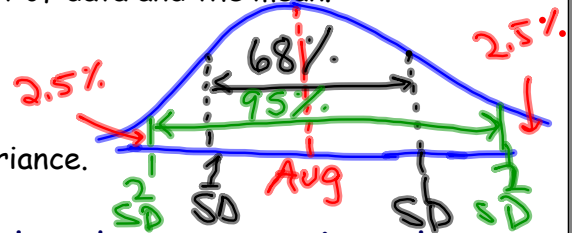
The **standard deviation** is the square root of the variance.

68%.   2.5%.
2.5%.   95%.

$\frac{2}{SD}$ $\frac{1}{SD}$ Avg   SD   SD

Standard Deviation--There is a complicated formula and we are not going to learn it. Instead you will do it the way described above :)

Ex 3. This table shows the length in thousands of miles of some of the longest rivers in the world. Find the standard deviation for these data.

River	Length (thousands of miles) X	$X - \bar{X}$	$(X-\bar{X})^2$
Nile	4.16	$4.16-2.85 = 1.31$	$(1.31)^2 = 1.7161$
Amazon	4.08	$4.08-2.85 = 1.23$	$(1.23)^2 = 1.5129$
Missouri	2.35	$2.35-2.85 = -.5$	$(-.5)^2 = .25$
Rio Grande	1.90	$1.9-2.85 = -.95$	$(-.95)^2 = .9025$
Danube	+ 1.78	$1.78-2.85 = -1.07$	$(-1.07)^2 = 1.1449$

Mean: $= 14.27 \div 5$
$\bar{X} = 2.85$
Mean

Find mean:
$= 5.5264 \div 5$
Variance $= 1.1052$
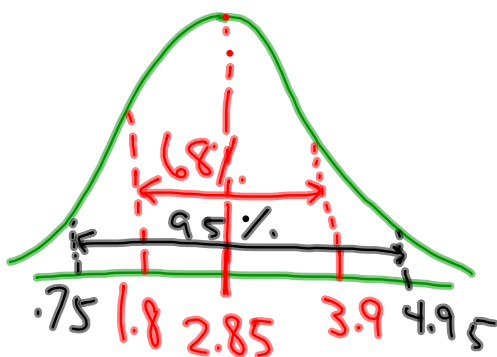
Standard Deviation: $\sqrt{1.1052} = \boxed{1.05}$

68%.
95%.
.75   1.8   2.85   3.9   4.95