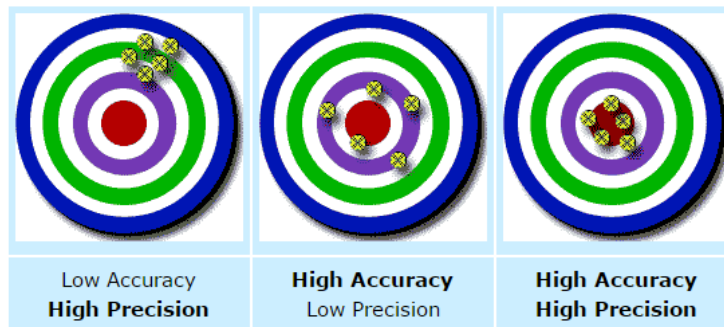


Part I Objective: To compare and contrast precision and accuracy.

Accuracy versus Precision

Example 1: If the goal is to hit a Bullseye . . .



a. Using the pictures above, what does it mean to be accurate?

b. Using the pictures above, what does it mean to be precise?

c. So, if you are playing soccer and you always hit the left goal post instead of scoring, then you are **not** _____, but you **are** _____!

Part II Objective: To calculate and apply standard deviation as a measure of spread.

Recently, we reviewed several measurements of data sets, including range (the difference between the greatest and least value). Range is a measurement of the spread of the data, but sometimes it doesn't give us the most accurate picture of the data.

Example 2: Consider the following data set: 3, 5, 1, 5, 1, 1, 2, 3, 15

a. Find the range of the data set. Does the range provide a good representation of the spread of the data? Explain why or why not.

Another way to measure the spread of a data set is standard deviation. The standard deviation (σ) of a data set is a measure of spread that uses all the values of the data set. It is calculated as follows:

Finding Standard Deviation using a Calculator

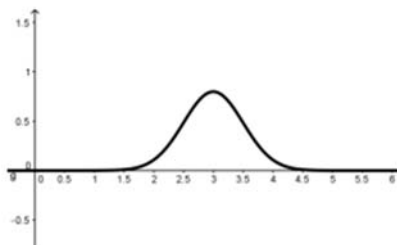
1. Press the STAT key
2. Press ENTER to select the 1: (Edit...) option.
3. Clear L1 by scrolling up to highlight "L1". Press CLEAR, ENTER.
4. Enter your data
5. Press STAT, scroll right to "CALC", press 1 for "1-Var Stats", press ENTER ($\sigma x =$ is your standard deviation)

b. Find the standard deviation of the above data set. Does this seem like a good representation of the spread of the data? Explain why or why not.

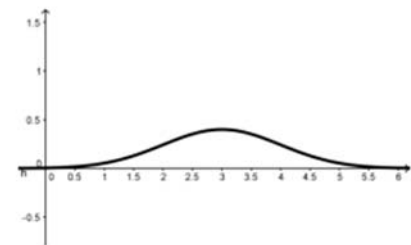
Example 3: Consider the distributions with their given mean and standard deviation.

a. How does standard deviation effect the shape of a frequency distribution curve?

Mean = 3, Standard Deviation = 0.5

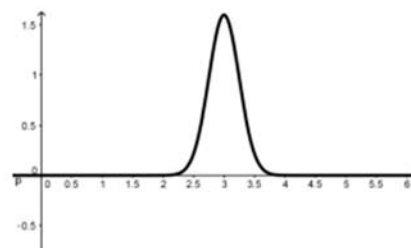


Mean = 3, Standard Deviation = 1



b. Why does it have the effect?

Mean = 3, Standard Deviation = 0.25



Example 4: Calculate the standard deviation of each data set below. Then rank the data sets below in order of greatest standard deviation to smallest:

$$A = \{1, 2, 3, 4\}$$

$$B = \{2, 2, 2, 2\}$$

$$C = \{2, 4, 6, 8\}$$

$$D = \{1, 1.5, 2, 2.5\}$$

Could you have ranked the data sets without calculating the standard deviation of each one? Explain.

Example 5: Jordan scores a 53 on his math test. The class average is 57 with a standard deviation of 2 points. How many standard deviations below the mean did Jordan score?

Example 6: Use the scores of two golfers, Golfer A and Golfer B, to answer the questions below.

a. Find the standard deviation of the scores of Golfer A. Interpret your result.

Golfer A		Golfer B	
83	88	89	87
84	95	93	95
91	89	92	94
90	87	88	91
98	95	89	92

b. Find the standard deviation of the scores of Golfer B. Interpret your result.

c. Compare the standard deviations for Golfer A and Golfer B. What can you conclude?