Task Background: In this week's discussion, you learned how to construct probability distributions and graph them. This week, you will review continuous probabilities, more specifically normal distributions.

You are hired as a statistical analyst for Silver's Gym, and your boss wants to examine the relationship between body fat and weight in men who attend the gym. After compiling the data for weight and body fat of 252 men who attend Silver's Gym, you find it relevant to examine the statistical measures and to perform hypothesis tests and regression analysis to help make general conclusions for body fat and weight in men.

Part I: Statistical Measures

Statistics is a very powerful topic that is used on a daily basis in many situations. For example, you may be interested in the age of the men who attend Silver's Gym. You could not assume that all men are the same age. Thus, it would be an inaccurate measure to state that "the average age of men who attend Silver's Gym is the same age as me."

Averages are only one type of statistical measurements that may be of interest. For example, your company likes to gauge sales during a certain time of year and to keep costs low to a point that the business is making money. These various statistical measurements are important in the world of statistics because they help you make general conclusions about a given population or sample.

To assist in your analysis for Silver's Gym, answer the following questions about the Body Fat Versus Weight data set:

Click here to download the Body Fat Weight data set.

- Calculate the mean, median, range, and standard deviation for the Body Fat Versus Weight data set. Report your findings, and interpret the meanings of each measurement.
- The measures of central tendency are important in real-world situations.
  - What is the importance of finding the mean/median? Why might you find this information useful?

- In some data sets, the mean is more important than the median. For example, you want to know your mean overall grade average because the median grade average would be meaningless. However, you might be interested in a median salary to see the middle value of where salaries fall. Explain which measure, the mean or the median, is more applicable for this data set.

- What is the importance of finding the range/standard deviation? Why might you find this information useful?

Part II: Hypothesis Testing

Organizations sometimes want to go beyond describing the data and actually perform some type of inference on the data. Hypothesis testing is a statistical technique that is used to help make inferences about a population parameter. Hypothesis testing allows you to test whether a claim about a parameter is accurate or not.

Your boss makes the claim that the average body fat in men attending Silver's Gym is 20%. You believe that the average body fat for men attending Silver's Gym is not 20%. For claims such as this, you can set up a hypothesis test to reach one of two possible conclusions: either a decision cannot be made to disprove the body fat average of 20%, or there is enough evidence to say that the body fat average claim is inaccurate.

To assist in your analysis for Silver's Gym, answer the following questions based on your boss's claim that the mean body fat in men attending Silver's Gym is 20%:

- First, construct the null and alternative hypothesis test based on the claim by your boss.
- Using an alpha level of 0.05, perform a hypothesis test, and report your findings. Be sure to discuss which test you will be using and the reason for selection.
- Based on your results, interpret the final decision to report to your boss.