NORMAL PROBABILITY DISTRIBUTION

What You Need to Know:

- The normal probability distribution is symmetric; the skewness is 0.
- The highest point on the curve is at the mean which is also the median and the mode.
- Standard deviation determines width of curve. The higher the standard deviation, the wider and flatter the curve is.
    - 68.26% of values of normal random variable fall in between one standard deviation of the mean.
    - 95.44% of values of normal random variable fall in between two standard deviations of the mean.
    - 99.72% of values of normal random variable fall in between three standard deviations of the mean.
- All variables have to be converted to the standard normal random variable in order to use the standard normal distribution table. This value is also called a Z-score.
- The formula to convert to a Z-score is: (variable-mean)/ standard deviation.
- To calculate a probability:
    - Convert the variable to the standard normal variable.
    - The number in front of the decimal and the first number after the decimal are along the left side of the chart (for example if the variable was 1.43, 1.4 would be on the left side of the chart).
    - The 2nd number after the decimal runs along the top of the chart (for example if the variable was 1.43, .03 would be along the top).
    - Where the two meet inside the chart is the probability.
- Make sure you understand what the probability inside the chart means: the probability is the area to the left of the Z variable or less than Z. If the probability is greater than Z, subtract the probability found in the chart from 1. (For example for 1.43 the probability is .6694 which is the left of Z or less than Z. Greater than Z or to the right of Z would be 1-.6694 = .3306.)
- When doing hypothesis testing the most used Z-values are:
    - $Z_{.05}$ = 1.645
    - $Z_{.025}$ = 1.960
    - $Z_{.005}$ = 2.576
    - $Z_{.1}$ = 1.282
    - $Z_{.01}$ = 2.33