**Z-Scores**

**Part I: Concepts**

1. What are always the mean and standard deviation of the z-distribution?

Always has a mean of 0 and standard deviation of 1.

1. Define the central limit theorem:

It is how a distribution of sample means is a more normal distribution than a distribution of scores, even when the population distribution is not normal.

1. Fill in the blanks: A z-score is based on a distribution of:

A z-score is based on a standard normal distribution of or equally likely events, while a z-statistic has a standard normal distribution, based on a distribution of sample percentage or average.

1. End-of-chapter problems: Remember to show work to receive partial credit where applicable. For help working on these problems, refer to the presentation from this module/week on the normal curve and computing z-scores. Formula (z = (X - μ) / σ).
* Raw and z-scores: 6.16: Population mean of 250 and standard deviation of 47, calculate z scores for each raw scores 391, 273, 199, and 160.
* A) 3.0: z = $ \frac{391-250}{47} $
* B) 0.48936170: z = $\frac{273-250}{47}$
* C) -1.08510638: z = $\frac{199-250}{47}$
* D) -1.91489362: z = $\frac{160-250}{47}$
* 6.20: Population with a mean of 250 and standard deviation of 47, convert each z scores to raw scores 0.54, -2.66, -1.0, and 1.79.
* A) 275.38: z score= 0.54 x 47 + 250
* B) 124.98: z score= -2.66 x 47 + 250
* C) 203: z score= -1.0 x 47 + 250
* D) 334.13: z score= 1.79 x 47 + 250
* *Estimating* percentages under normal curve: Question 6.27: Assume a normal distribution:

a. What percentage of scores falls below the mean? 50%

b. What percentage of scores falls between 1 standard deviation below the mean and 2 standard deviations above the mean? 14%

c. What percent of scores lies beyond 2 standard deviations away from the mean (on both sides)? 2%

d. What percentage of scores is between the mean and 2 standard deviations above the mean? 14%

e. What percentage of scores fall under normal curve? 50%

 Distribution of means and z-statistic: Question 6.28: Compute standard error (σ*M*) for each of the following sample sizes, assuming a population mean of 100 and a standard deviation of 20: (σM = σ/√N)

a. 45 (σM = 0.33 σ= 20 √N= 6.708203932499369) b. 100 (σM= 0.5 σ= 20 /√N= 10) c. 4500 (σM = 3.35 σ= 20 √N= 67.08203932499368)