§12.1: Sampling Distribution of a Sample Mean

1.] Suppose we know that the average yearly income of a Kutztown University graduate that obtained a Bachelor of Science is \$70K with a standard deviation of \$3K.

a.) What is the proper notation for the two numbers presented above?

b.) Assume that the population distribution is Normal. Suppose we select a *single* KU graduate from the population. What is the probability that this person makes more than \$71K a year?

c.) Suppose we take a random sample of $n = 20$ KU graduates with BS degrees. What is the mean and standard deviation of the sampling distribution of sample means from samples of this size? Is it Normally distributed?

d.) Suppose we take a random sample of $n = 100$ KU graduates with BS degrees. What is the mean and standard deviation of the sampling distribution of sample means from samples of this size? Is it Normally distributed? What is the probability that our mean, $\bar{x}$, from this sample is greater than \$71K?

2.] A recent study has shown that the "normal" Twitter user (which doesn't include the Kardashians or any celebrity user that has more than 100K followers) has 453 followers, on average, with a standard deviation of 387 followers. This is based on 95,886,071 Twitter users who have tweeted at least once in the past 6 months. Taking these number as population parameters, answer the following questions:

a.) Would you expect the distribution of normal Twitter user followers to be Normally distributed? Why or why not? Sketch what you think this population distribution might look like.

b.) What is the probability that we select a *single* Twitter user from this population that has more than 480 followers?

c.) Suppose we take a sample of size $n = 10$ Twitter followers from this population. What is the mean and standard deviation of the sampling distribution of sample means? Is it Normal?

d.) Suppose we take a sample of size $n = 400$ Twitter followers from this population. What is the mean and standard deviation of the sampling distribution of sample means? Is it Normal? What is the probability that the sample mean of Twitter followers, $\bar{x}$, from a sample of this size is more than 480?