Formative Quiz 1 (Sampling Distributions and Standard Errors) Solutions

1. The sampling distribution of a sample statistic (such as a sample mean or proportion etc.) is:

   Answer: The theoretical distribution of all possible values of sample statistic from all possible random samples of the same size from the same population.

2. The variability in a collection of sample statistics from larger sized samples will tend to be _____ than/as variability from smaller sizes samples from the same population.

   Answer: Smaller

   Reasoning: Recall from the simulation results that were ultimately generalized via the CLT, the variability in sample statistic values across multiple random samples of the same size from the same population decreased with larger sample sizes.

3. If the underlying distribution of a population is right skewed, the sampling distribution of sample means from multiple random samples of the same size will tend to be:

   Answer: (approximately) Normal

4. Similar to sample means, variation in the sampling distribution of the sample statistic p-hat (sampling proportion) will:

   Answer: decrease as the sample size increases.

   Reasoning: Recall from the simulation results that were ultimately generalized via the CLT, the variability in sample statistic values across multiple random samples of the same size from the same population decreased with larger sample sizes.

5. The mean value of a sampling distribution of the incidence rates from a population:

   Answer: remains roughly equal despite the size of the samples.

   Reasoning: Recall from the simulation results that were ultimately generalized via the CLT, that the center (mean) of the simulated sampling distributions remained consistent across simulations based on differing sample sizes (but the variability in the estimates in these distributions decreased with increasing sample size)

6. The standard error of a sample mean estimate decreases as:

   Answer: As the sample size on which the mean is based increases.

7. The theoretical standard error of the sampling distribution of p-hat, the sample proportion, is equal to:

   Answer: $\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$

8. The Central Limit Theorem allows for a researcher to:

   Answer: estimate the sampling distribution of a sample statistic using the results from one sample taken from the population of interest.