Assignment: Sampling Distributions

1. A population has a mean of 50 and a standard deviation of 6. (a) What are the mean and standard deviation of the sampling distribution of the mean for N = 16? (b) What are the mean and standard deviation of the sampling distribution of the mean for N = 20?

2. Given a test that is normally distributed with a mean of 100 and a standard deviation of 12, find:

(a) the probability that a single score drawn at random will be greater than 110
(b) the probability that a sample of 25 scores will have a mean greater than 105
(c) the probability that a sample of 64 scores will have a mean greater than 105
(d) the probability that the mean of a sample of 16 scores will be either less than 95 or greater than 105

3. What term refers to the standard deviation of the sampling distribution?

4. (a) If the standard error of the mean is 10 for N = 12, what is the standard error of the mean for N = 22? (b) If the standard error of the mean is 50 for N = 25, what is it for N = 64?

5. If numerous samples of N = 15 are taken from a uniform distribution and a relative frequency distribution of the means is drawn, what would be the shape of the frequency distribution?

6. A variable is normally distributed with a mean of 120 and a standard deviation of 5. Four scores are randomly sampled. What is the probability that the mean of the four scores is above 127?

7. In a city, 70% of the people prefer Candidate A. Suppose 30 people from this city were sampled. (a) What is the mean of the sampling distribution of p? (b) What is the standard error of p? (c) What is the probability that 80% or more of this sample will prefer Candidate A? (d) What is the probability that 45% or more of this sample will prefer some other candidate?

8. In the population, the mean SAT score is 1000. Would you be more likely (or equally likely) to get a sample mean of 1200 if you randomly sampled 10 students or if you randomly sampled 30 students? Explain.

9. True/false: The standard error of the mean is smaller when N = 20 than when N = 10.

10. True/false: You choose 20 students from the population and calculate the mean of their test scores. You repeat this process 100 times and plot the distribution of the means. In this case, the sample size is 100.

11. True/false: In your school, 40% of students watch TV at night. You randomly ask 5 students every day if they watch TV at night. Every day, you would find that 2 of the 5 do watch TV at night.