| Suggested Answers for WarmUps for Lesson 17 | |
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| 1. | What is a sampling distribution? Give an example |
| Answer | It is the distribution, that is, the center, spread and shape, of a statistic, such as a sample mean or sample proportion. Examples will vary. |
| 2. | Complete the following statement: The expected value of the sampling distribution of X-bar equals the population mean, mu, . . . . |
| Answer | always. |
| 3. | Random samples of size n are selected from an infinite population. Describe the changes to the distribution of a statistic such as X-bar as n increases. Be as specific as possible, please. |
| Answer | As n increases the standard error decreases, the shape of the distribution becomes more and more symmetric and bell shaped, then taller and narrower, until the sampling distribution collapses into its center, either mu or pi. |
| 4. | Suppose that 60% of the adult population prefers coffee over tea. If you take random samples of 100 adults, 10% of sample proportions will be larger than what value? Answer this question with the correct Excel command, including appropriate parameters. |
| Answer | 0.6*100=60, so this is sufficiently symmetric to estimate using the Normal. The expected value of the sample proportion is pi = 0.6and the standard error is SQRT(0.6*0.4*/100) = 0.04899. The Excel command is =NORMINV(1-0.10,0.1,0.04899) = 0.16278. |
| 5. | Conceptually, how are standard errors and standard deviations related? |
| Answer | Standard errors are a function of standard deviation, specifically they are the standard deviation divided by the square root of the sample size. |
| 6. | Relatively speaking, how do standard errors and standard deviations compare in size? |
| Answer | Standard errors are always smaller than standard deviations. |
| 7. | What must be known about a population before we can apply the Central Limit Theorem? |
| Answer | Virtually nothing. We must have some kind of a quantitative variable so that we know there is a mean and standard deviation of the population, but that is it. |
| 8. | Does the distribution of the population the samples are drawn from matter to the distribution of the sample means? If so, how? |
| Answer | It matters if there is reason to believe that the population is normal. If it is normal in shape, the distribution of sample means will be exactly normal and smaller sample sizes may be used. |