

- The following ranges are possible 95% confidence intervals for the percentage of Americans who think they work too many hours. For which one of the confidence intervals could you conclude that a majority of the population thinks they work too many hours?
 - 41% to 49%
 - 49% to 54%
 - 52% to 58%**
 - 42% to 51%
- Which of the following statements is correct about a parameter and a statistic associated with repeated random samples of the same size from the same population?
 - Values of a parameter will vary from sample to sample but values of a statistic will not.
 - Values of both a parameter and a statistic may vary from sample to sample.
 - Values of a parameter will vary according to the sampling distribution for that parameter.
 - Values of a statistic will vary according to the sampling distribution for that statistic.**
- Five hundred (500) random samples of size $n=900$ are taken from a large population in which 10% are left-handed. The proportion of the sample that is left-handed is found for each sample and a histogram of these 500 proportions is drawn. Which interval covers the range into which about 68% of the values in the histogram will fall?
 - .1 \pm .010**
 - .1 \pm .0134
 - .1 \pm .0167
 - .1 \pm .020
- A polling organization routinely takes random samples of 1000 and asks them a series of questions. If the population proportion that would answer "yes" to a question is about .4, then what are the mean and standard deviation of the sampling distribution of \hat{p} ?

$$\text{Mean} = p = .4$$

$$\text{Standard deviation} = \text{s.d.}(\hat{p}) = \sqrt{\frac{p(1-p)}{n}} = \sqrt{\frac{(.4)(.6)}{1000}} = .0155$$

- NOTE TO 2006 STUDENTS:** *This problem is appropriate for next week, not this week.*

A store manager is trying to decide whether to price oranges by weight, with a fixed cost per pound, or by the piece, with a fixed cost per orange. For one week the oranges are priced by the piece rather than by weight, and during this time the mean weight of the oranges purchased is recorded for all customers who buy 4 of them. The manager knows the population of weights of individual oranges is bell-shaped with mean of 8 ounces and a standard deviation of 1.6 ounces. If the 4 oranges each customer chooses are equivalent to a random sample, what should be the approximate mean and standard deviation of the distribution of the mean weights of 4 oranges?

$$\text{Mean} = 8 \text{ ounces}$$

$$\text{Standard deviation} = \text{s.d.}(\bar{x}) = \frac{\sigma}{\sqrt{n}} = \frac{1.6}{\sqrt{4}} = 0.8 \text{ ounces}$$

For Questions 6 and 7: A 95% confidence interval for the proportion of young adults who skip breakfast is .20 to .27.

6. Which of the following is a correct interpretation of the 95% *confidence level*?
- A. **In about 95% of all studies for which this procedure is used, the confidence interval will cover the true population proportion, but there is no way to know if this interval covers the true proportion or not.**
 - B. There is a 95% probability that the proportion of young adults who skip breakfast is between .20 and .27.
 - C. If this study were to be repeated with a sample of the same size, there is a 95% probability that the sample proportion would be between .20 and .27.
 - D. The proportion of young adults who skip breakfast 95% of the time is between .20 and .27.
7. Which of the following is the correct interpretation of the 95% confidence interval?
- A. There is a 95% probability that the proportion of young adults who skip breakfast is between .20 and .27.
 - B. If this study were to be repeated with a sample of the same size, there is a 95% probability that the sample proportion would be between .20 and .27.
 - C. We can be 95% confident that the proportion of young adults in the sample who skip breakfast is between .20 and .27.
 - D. **We can be 95% confident that the proportion of young adults in the population who skip breakfast is between .20 and .27.**
8. A poll is done to estimate the proportion of adult Americans who like their jobs. The poll is based on a random sample of 400 individuals. What is the “conservative” margin of error of this poll?
- A. 0.10
 - B. **0.05**
 - C. 0.04
 - D. 0.025
9. A randomly selected sample of 400 students at a university with 15-week semesters was asked whether or not they think the semester should be shortened to 14 weeks (with longer classes). Forty-six percent (46%) of the 400 students surveyed answered "yes." Which one of the following statements about the number 46% is correct?
- A. **It is a sample statistic.**
 - B. It is a population parameter.
 - C. It is a margin of error.
 - D. It is a standard error.

10. In a survey of $n = 100$ people, 10% are left-handed. Using the "exact" formula for margin of error, calculate a 95% confidence interval for the population proportion who are left-handed.

$$s.e.(\hat{p}) = \sqrt{\frac{(.1)(.9)}{100}} = .03, \text{ so the interval is } .1 \pm 2(.03) \text{ or } .1 \pm .06 \text{ or } .04 \text{ to } .16.$$