Math 455 – Statistics
Multiple choice practice with confidence intervals

1. Based upon a random sample of 30 seniors in a high school, a guidance counselor finds that 20 of these seniors plan to attend an institution of higher learning. A 90% confidence interval constructed from this information yields (0.5251, 0.80823). Which of the following is a correct interpretation for this interval?

A) We can be 90% confident that 52.51% to 80.82% of our sample seniors plan to attend an institution of higher learning.
B) We can be 90% confident that 52.51% to 80.82% of seniors at this high schools plan to attend an institution of higher learning.
C) We can be 90% confident that 52.51% to 80.82% of seniors in any school plan to attend an institution of higher learning.
D) This interval will capture the true proportion of seniors from this high school who plan to attend an institution of higher learning 90% of the time.
E) This interval will capture the true proportion of seniors in our sample who plan to attend an institution of higher learning 90% of the time.

2. Suppose the adult unemployment rate of a city is 4.8%. If you had taken a survey of 100 adults constructed a 95% confidence interval for the proportion of unemployed adults, which of the following would have been true?
   A) The interval would have contained 4.8%.
   B) The center of the interval would have been 4.8%.
   C) You have a 95% probability that the interval contains 4.8%.
   D) Increasing the sample size would ensure capturing 4.8%.
   E) Approximately 95% of similarly constructed intervals would capture 4.8**%**

3. A recent news program reported that the presidential approval rate was 51% with a margin of error of ±4%. What is meant by 4%?
   A. 4% of the respondents were undecided.
   B. The proportion of Americans who approve of the president is between 49% and 55%
   C. The president's approval rating from those sampled was between 47% and 55%.
   D. The proportion of Americans who approve of the president is between 47% and 55%.
   E. Unless the true proportion of Americans who approve of the president is between 47% and 55%, it is unlikely that we could have obtained these results.

4. Changing from a 95% confidence estimate for a population proportion to a 99% confidence interval estimate, with all other things being equal
   A. Increases the interval size by 4%
   B. Decreases the interval size by 4%
   C. Increases the interval size by 31%
   D. Decreases the interval size by 31%
   E. This question cannot be answered without knowing the sample size.

5. In general how does doubling the sample size change the confidence interval?
   A. Doubles the interval size
   B. Halves the interval size
   C. Multiplies the interval size by 1.414
   D. Divides the interval size by 1.414
   E. This question cannot be answered without knowing the sample size.

6. One month the unemployment rate in France was 13.4%. If during that month you took a SRS of 100 Frenchmen and constructed a confidence interval estimate of the employment rate, which of the following would be true?

   I. The center of the interval was 13.4
   II. The interval contained 13.4
   III. A 99% confidence interval estimate contained 13.4

   A) I and II
   B) I and III
   C) II and III
   D) I, II, and III
   E) None of the above gives the complete set of true responses.

7. Under what conditions would it be meaningful to construct a confidence interval estimate when the data consist of the entire population?

   A) If the population is small (less than 30)
   B) If the population is large (more than 30)
   C) If a higher level of confidence is desired
   D) If the population is truly random
   E) None

8. In general, how does tripling the sample size change the confidence interval?
   A) Triples the interval size
   B) Divides the interval size by 3
   C) Multiplies the interval size by 1.732
   D) Divides the interval size by 1.732
   E) This question cannot be answered without knowing the sample size.

9. A 1999 survey A 1999 survey of 500 households concluded that 82% of the population uses grocery coupons. Which of the following best describes what is meant by the poll having a margin of error of 3%?
   A) Three percent of those surveyed refused to participate in the poll.
   B) It would not be unexpected for 3% of the population to begin using coupons or stop using coupons.
   C) Between 395 and 425 of the 500 households surveyed responded that they used grocery coupons.
   D) If a similar survey of 500 households were taken weekly, a 3% change in each week's results would not be unexpected.
   E) It is likely that between 79% and 85% of the population use grocery coupons

10. A survey was conducted to determine the percentage of high school students who planned to go to college. The results were stated as 82% with a margin of error of 5%. What is meant by +/- 5%?
   a) Five percent of the population were not surveyed.
   b) In the sample, the percentage of students who plan to go to college was between 77% and 87%
   c) The percentage of the entire population of students who plan to go to college is between 77% and 87%
   d) It is unlikely that the given sample proportion result would be obtained unless the true percentage was between 77% and 87%
   e) Between 77% and 87% of the population were surveyed.

11. We are interested in the proportion p of people who are unemployed in a large city. Eight percent of a SRS of 500 people are unemployed. What is the midpoint for a 95% confidence interval estimate of p?

A) .012
B) .025
C) .475
D) P
E) None of the above

12. A confidence interval estimate is determined from monthly grocery expenditures in a random sample of *n* families. Which of the following will result in a smaller margin of error?

I. A smaller confidence level
II. A smaller sample standard deviation
III. A smaller sample size

A) II only
B) I and II
C) I and III
D) II and III
E) I, II, and III

13. A pollster working on an issue of national importance wants to be sure that the percentage of people with a certain opinion differs by no more than 3%. What sample size should be used for the poll?
A) 9
B) 17
C) 278
D) 556
E) There is not enough information to determine sample size.

14. In a very large school district, the food services administrator wishes to determine the proportion of students who will buy a school lunch to within ±0.03. Using the most conservative estimate for p, how many students should this administrator survey to have 90% confidence?
A) 164
B) 271
C) 457
D) 752
E) 1844

15. A 1993 LA Times poll of 1703 adults revealed that only 17% thought the media was doing a "very good" job. With what degree of confidence can the newspaper say that 17% ± 2% of adults believe the media is doing a "very good" job?

A) 72.9%
B) 90.0%
C) 95.0%
D) 97.2%
E) 98.6%