pName:_____ Date:_____

AP Stats Chapter 10 Review #2 Confidence Interval

1. You take a random sample from some population and form a 96% confidence interval for the population mean, μ . Which quantity is guaranteed to be in the interval you form?

a) 0 b) μ c) $\bar{x}$ d) 0.96

2. Decreasing the sample size, while holding the confidence level the same, will do what to the length of your confidence interval?

a) Make it bigger b) make it smaller c) it will stay the same

3. If you increase the sample size and confidence level at the same time, what will happen to the length of your confidence interval?

a) Make it bigger b) make it smaller c) it will stay the same

4. Which of the following is a property of the Sampling Distribution of $\bar{x}$?
   a) If you increase your sample size, $\bar{x}$ will always get closer to μ , the population mean
   b) The standard deviation of the sample mean is the same as the standard deviation from the original population σ
   c) The mean of the sampling distribution of $\bar{x}$ is μ , the population mean
   d) $\bar{x}$ always has a Normal distribution

5. Suppose that we wanted to estimate the true average number of eggs a queen bee lays with 95% confidence. The margin of error we are willing to accept is 0.5. Suppose we also know that "s" is about 10. What sample size should we use ?

a) 1536 b) 1537 c) 1538 d) 2653 e) 2650

6. What should be the value of "z" used in a 93% confidence interval?

a) 2.70 b) 1.40 c) 1.81 d) 1.89 e) 1.95

7. What are the possible values of $\bar{x}$ for all samples of a given "n" from this population? To answer this question, we need to look at the:

a) Test statistics b) z-scores of several statistics c) standard normal distribution

d) Sampling distribution e) Probability distribution of "x"

8. A 95% confidence interval for the mean number of TV's per American household is (1.15, 4.20). For each of the following statements about the above confidence interval, choose whether if it is TRUE or FALSE:

a) The probability that μ is between 1.15 and 4.20 is 95%

b) We are 95% confident that the true mean number of tv's per American household is between 1.15 & 4.20

c) 95% of all samples should have $\bar{x}$ between 1.15 and 4.20

d) 95% of all American households have between 1.15 and 4.20 televisions

e) Of 100 intervals calculated the same way (95%), we expect 95 of them to capture the population mean

f) Of 100 intervals calculated the same way (95%), we expect 100 of them to capture the sample mean

9. A survey of 200 students provides a sample mean of 7.10 hours worked. What is a 95% confidence interval based on this sample?

a) (6.10, 8.10) b) (6.41, 7.79) c) (6.57, 7.63) d) (7.10, 8.48)

10. Suppose that this confidence interval was (6.82, 7.38). Which of these is a valid interpretation of this confidence interval?

a) There is a 95% probability that the true average number of hours worked by all UF students is between 6.82 and 7.38 hours
b) There is a 95% probability that a randomly selected student worked between 6.82 and 7.38hours
c) We are 95% confident that the average number of hours worked by students in our sample is between 6.82 and 7.38 hours
d) We are 95% confident that the average number of hours worked by all UF students is between 6.82 and 7.38 hours

11. We have 95% confidence in our interval, instead of 100% because we need to account for the fact that:

a) The sample may not be truly random b) we have a sample, and not the whole population

c) the distribution of hours worked may be skewed d) all of the mentions answers

12. The researchers are not satisfied with their confidence interval and want to do another study to find a shorter confidence interval. What should they change to ensure they find a shorter confidence interval

a) They should increase their confidence level and increase sample size

b) They should increase their confidence level but decrease sample size

c) They should decrease their confidence level and increase sample size

d) They should decrease their confidence level and decrease sample size

13. The executives and a company having recently solved their widget crises, have another major problem with one of their products. Many cities are sending complaints that their manhole covers are defective and people are falling into sewers. The company is prety sure that only 4% of their manholes are defective, but they would like to do a study to confirm this number. They are hoping to construct a 95% confidence interval to get within 0.01 of the true proportion of defective manhole covers. How many manhole covers need to be tested?

a) 8 b) 1476 c) 9604 d) 9605

14. The workers at the company took a random sample of 800 manhole covers and found that 40 of them were defective. What is the 95% C.I. for "p", the true proportion of defective manhole covers, based on this sample ?

a) (37.26, 42.74) b) (0.035, 0.065) c) (0.047,0.053) d) (0.015, 0.085)

15. A random sample of married people were asked "Would you remarry your spouse if you were given the opportunity for a second time?"; Of the 150 people surveyed, 127 of them said that they would do so. Find a 95% confidence interval for the proportion of married people who would remarry their spouse?

a) 0.847 ± 0.002 b) 0.847 ± 0.029 c) 0.847 ± 0.048

d) 0.847 ± 0.058 e) 0.847 ± 0.113

16. You would like to estimate the proportion of "regular users of vitamins" in a large population. In order to find a confidence interval for the proportion,

a) We must assume that we have a random sample from a normal population
b) We must assume that we have a random sample from a binomial population where $np>15$ and $n(1-p)>15$
c) We must assume that the population is normal (but we do not require a random sample because of the Central Limit Theorem)
d) We do not need to assume that the population is normal nor that the sample is random (because of the Central Limit Theorem)
e) We do not need to assume anything

17. A political poll of Americans was conducted to investigate their opinions on gun control. Each person was asked if they are in favor of gun control or not in favor of gun control – no respondents were removed from the results. The survey found that 25% of people contacted were not in favor of gun control laws. These results were accurate to within 3 percentage points, with 95% confidence. Which of the following is NOT correct?

a) The 95% confidence interval is approximately from (22% to 28%)
b) We are 95% confidence that the true proportion of people not in favor of gun control is within 3 percentage points of 25%
c) In approximately 95% of polls on this issue, the confidence interval will include the sample proportion
d) If another poll of similar size were taken, the percentage of people in FAVOR of gun control would likely range from 72% to 78%

18. Suppose we are interested in finding a 95% confidence interval for the proportion "p" of UBC undergraduates students who are not from BC. We take a random sample of 20 students, and we find that 17 of them are not from BC. Which of the following is the small sample confidence interval for "p", using 95% confidence ?

a) (0.694, 1.00) b) (0.629, 0.954) c) (0.850, 0.930) d) (0.688, 1.00)

19. Which of the following statements about small sample and large sample confidence intervals for proportions are true?

I) Large sample confidence interval formula for proportions is valid if $np \geq 15$ and $n(1-p) \geq 15$

II) Large sample confidence intervals always contain the true parameter value, whereas small sample confidence intervals may not

III) We form a small sample confidence intervals by using the large sample formula afetr adding 4 success and 4 failures

a) I and III only b) II only c) I only d) I, II and III

Question 20 to 22: Suppose we are interested in finding a 95% confidence interval for the mean SAT Verbal score of students at Moscrop Secondary. Five students are sampled, and their SAT verbal scores are 560, 500, 470, 660, and 640.

20. What is the standard error of the sample mean?

a) 16.71 b) 37.36 c) 83.55 d) 113.2

21. What is the 95% confidence interval for the population mean?

a) (462.3, 669.7) b) (469.9, 662.1) c) (486.3, 645.7) d) (492.8, 639.2)

22. The method used to calculate confidence interval in the previous questions assumes which one of the following ?
    a) The sample mean equals the population mean
    b) The sample standard deviation does not depend on the sample drawn
    c) The population has an approximately normal distribution
    d) The degrees of freedom $df \geq 30$

23. : We know that 65% of all Canadians perfer chocolate over vanilla ice cream. Suppose that 1000 people were randomly selected. What is the standard error of the sample proportion?

a) 0.03567 b) 0.01508 c) 0.01798 d) 0.3785

Answer:

1C	2A	3D	4C	5B	6C	7D	8a)F	8b) T	8c) F
8d) F	8e) T	8f) T	9B	10D	11B	12C	13B	14B	15D
16B	17C	18B	19C	20B	21A	22C	23B		