Ch. 8.1, 8.2, 8.3

STA 2e: Sect-9.1 Worksheet Name _____

CONFIDENCE INTERVALS

1. $\hat{p}$ is called the ..... and p is a .....

   Which is a parameter? ..... Which is a statistic? .....

2. A major concern today is the safety of people talking on cell phones while driving. A survey of 12,000 teenagers in Texas found that 5,762 admitted to talking on a cell phone while driving. While this sample is not an SRS, it is close enough that our method gives an approximately correct confidence interval.

   a. Find $\hat{p}$. .....

   b. What is the population of interest? .....

   c. What type of bias is likely to occur in this survey? Do you think the proportion of teenagers talking on a cell phone while driving is higher or lower than stated above? Explain.

   .....

   .....

   d. Using the formula for a confidence interval, $\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$, find each of the following intervals. Show substitutions into the formula.

   90% confidence interval:

   95% confidence interval:

   99% confidence interval:

   e. Write an interpretation of your 90% confidence interval.

   .....

   .....

   f. Write an interpretation of your 90% confidence level.

   .....

   .....

3. As the level of confidence increases, the interval length ..... *(narrows/widens/stays the same)*

4. As the sample size increases, the interval length ..... *(narrows/widens/stays the same)*

5. A sample survey found that 79% of 9,132 adults have a landline phone.

   a. Approximately how many people in the survey said that they have a landline phone? .....

b. Do you think that this survey will have more, less or about the same amount of bias as #2? Explain.

.....

.....

c. Find a 90% confidence interval for the true proportion of adults who have a landline phone.

.....

d. A 95% confidence interval for the survey is found to be (78.2%, 79.8%). Consider the following statements.

(1) We are 95% certain that between 78.2% and 79.8% of those surveyed have a landline phone.
(2) We are 95% certain that between 78.2% and 79.8% of all adults have a landline phone.
(3) If we repeatedly took more samples of 9,132 adults, then we are 95% certain that 79% will be contained in new intervals.
(4) If we repeatedly took more samples of 9,132 adults, then the true population proportion would be captured in the given interval 95% of the time.
(5) If we repeatedly took more samples of 9,132 adults, then 95% of all intervals created would capture the true population proportion.

Which of these statements is an appropriate interpretation of this interval? .....

Which of these statements is an appropriate interpretation of the level? .....

6. When looking for the sample size for a given margin of error, use ..... for the sample proportion.

7. When looking for the sample size for a given margin of error, how should the answer be rounded? .....

8. Suppose we wish to do a random sample survey with a margin of error of ± 2% at the 90% confidence level. How many people do the pollsters need to interview? Set up an equation and solve.

n = ...

9. Suppose we wish to do a random sample survey with a margin of error of ± 3.5% at the 99% confidence level. How many people do the pollsters need to interview? Set up an equation and solve.

n = ...

10. Suppose we wish to do a random sample survey with a margin of error of ± 4% at the 95% confidence level. How many people do the pollsters need to interview? Set up an equation and solve.

n = ...