Table Number:_____ Group Name: _____

Group Members:_____ _____ _____

Calculating and Interpreting Confidence Intervals

WHAT IS A SUCCESS?

For each of the following scenarios:

Describe what represents a successful trial and state the number of expected successes

a) Describe what represents a failed trial and state the number of expected failures.

1. According to Wikipedia, roughly 7% of American households are considered millionaires. Suppose you take a random sample of 833 Americans. Answer the provided questions.

    a) A success is

    b) A failure is

2. According to a census study, 33% of American adults have earned a bachelor's degree or higher. Given a random sample of 25 American adults, answer the provided questions.

    c) A success is

    d) A failure is

3. According to the World Health Organization, the Ebola virus has a 50% fatality rate. If a random sample of 44 contractors of the Ebola virus is taken, answer the provided questions.

    e) A success is

    f) A failure is

FINDING AND INTERPRETING CONFIDENCE INTERVALS

In a poll of 545 incoming KSU freshman, only 45% felt prepared for their first college mathematics course. Assuming the participants were chosen randomly, create a 95% confidence interval for the proportion of ALL incoming KSU freshmen that felt prepared for their first college mathematics course using the following steps:

1.
   a) Does this poll provide enough expected students that **feel prepared**? Explain how you know.

   b) Does this poll provide enough expected students that **do not** feel prepared? Explain how you know.

   c) What criteria of the Central Limit Theorem Conditions is being satisfied by the two previous question?

2. State the sample size, n, and the sample proportion, $\hat{p}$.

3. Find the standard error

4. State the critical z-value for a 95% confidence interval for proportions and use it to calculate the margin of error, m.

5. Use the previous found values to state the 95% confidence interval in interval notation.

6. In your own words, write an interpretation of the confidence interval found in the previous question.

7. What is the difference between interpreting a confidence INTERVAL and a confidence LEVEL?

8. Write an interpretation of the confidence LEVEL in the context of the scenario.

EFFECTS OF SAMPLE SIZE ON STANDARD ERROR AND CONFIDENCE INTERVALS

Suppose that when reporting the information from the previous scenario, a typo was missed and the number of incoming freshmen was reported as 54 (not 545).

9. If you tried to test the Central limit theorem conditions from the previous question using only 54 people, would any Central Limit Theorem conditions fail?

10. Calculate a new standard error based on the typo. Describe the effect that making the sample size smaller has on the standard error.

11. Calculate the margin of error based on the typo. Describe the effect that making the sample size smaller has on the margin of error.

12. State the confidence interval in interval notation. Describe the effect that making the sample size smaller has on the confidence interval.