Sample Proportion Problems   Date _____

1. In which year did Columbus first land in the Americas?

   a. A Gallup Poll found that 210 out of 501 American teens 13-17 yrs old knew this year. Is this a parameter or a statistic? Represent this value using the correct notation.

   b. If 45% of all American teens 13-17 yrs old know this year, what is the probability of getting a result as small or less than the result in part a? Check to make sure we can use a Normal approximation.

2. One way to check for sources of bias in a sample survey is to compare the sample with known facts about the population. About 11% of American adults are black. The proportion p of black adults in an SRS of 1500 adults should therefore be close to 0.11. If a national sample contains only 9.2% of black adults, should we suspect that the sample is underrepresenting black adults?

Confirm that this situation satisfies both the Large Count Condition and 10% Condition.

Find the probability that a sample contains no more than 9.2%.

3. A *USA Today* poll asked a random sample of 1012 U.S. adults what they do with the milk in the bowl after they have eaten the cereal. Of the respondents, 67% said that they drink it. Suppose that 70% of U.S. adults actually drink the cereal milk. Use our work from yesterday to answer these questions.

a. Check that you can use the Normal approximation for the distribution of $\hat{p}$.

b. Find the probability of obtaining a sample of 1012 adults in which 67% or fewer say they drink the cereal milk. Do you have any doubts about the result of this poll?

4. Your mail-order company advertises that it ships 90% of its orders within three working days. You select an SRS of 100 of the 5000 orders received in the past week for an audit. The audit reveals that 86 of these orders were shipped on time. If the company really ships 90% of its orders on time, what is the probability that the proportion in an SRS of 100 orders is as small as the proportion in your sample or smaller?

5. A polling organization asks a SRS of 1500 freshman college students whether they applied to a college other than the one they are attending. In fact, 35% of all freshmen didn't apply to another college. What is the probability that the random sample of 1500 students will give a result within 2 percentage points of the true proportion of freshmen who applied to another college?