

A.P. Statistics
Assignment 9.3

Remember to show your thinking through your work.

- 1) What assumptions must we make in determining the necessary sample size for a study of categorical data (using proportions)?

- 2) Why do we assume $p=0.5$ in determining the necessary sample size?

- 3) The Gallup Poll asked a sample of 1785 U.S. adults, "Did you, yourself, happen to attend church or synagogue in the last 7 days?" Of the respondents, 750 said "Yes." Suppose that Gallup's sample was an SRS. How large a sample would be required to obtain a margin of error of 0.01 in a 99% confidence interval for the proportion who attend church or synagogue? (Use Gallup's result as the guessed value of p .)

- 4) Land's Beginning is a company that sells its merchandise through the mail. It is considering buying a list of addresses from a magazine. The magazine claims that at least 25% of its subscribers have high incomes (they define this to be household income in excess of \$100,000). Land's Beginning would like to estimate the proportion of high-income people on the list. Checking income is very difficult and expensive but another company offers this service. Land's Beginning will pay to find incomes for an SRS of people on the magazine's list. They would like the margin of error of the 95% confidence interval for the proportion to be 0.05 or less. Use the guessed value $p = 0.25$ to find the required sample size.

- 5) A student organization wants to start a nightclub for students under the age of 21. To assess support for this proposal, they will select an SRS of students and ask each respondent if he or she would patronize this type of establishment. They expect that about 60% of the student body would respond favorably. What sample size is required to obtain a 95% confidence interval with an approximate margin of error of 0.08? Suppose that 50% of the sample responds favorably. Calculate the margin of error of the 95% confidence interval.

- 6) For a single proportion the margin of error of a confidence interval is largest for any given sample size n and confidence level C when $\hat{p} = 0.5$. This led us to use $\hat{p} = 0.5$ for planning purposes. Use these conservative values in the following calculations, and assume that the sample sizes of n . Calculate the margins of error of the 99%

confidence intervals for the following choices of n : 10, 30, 50, 100, 200, and 500. Present the results in a table. Summarize your conclusions.

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7) Provide a complete response for the following:

5. A large university provides housing for 10 percent of its graduate students to live on campus. The university's housing office thinks that the percentage of graduate students looking for housing on campus may be more than 10 percent. The housing office decides to survey a random sample of graduate students, and 62 of the 481 respondents say that they are looking for housing on campus.
 - (a) On the basis of the survey data, would you recommend that the housing office consider increasing the amount of housing on campus available to graduate students? Give appropriate evidence to support your recommendation.
 - (b) In addition to the 481 graduate students who responded to the survey, there were 19 who did not respond. If these 19 had responded, is it possible that your recommendation would have changed? Explain.