

You may work with one other person on this assignment, submitting one report with both names, provided that both of you contribute substantially to the work.

***Penny For Your Thoughts?***

In June of 2004, the Harris organization asked a random sample of 2136 adult Americans: “Would you favor or oppose abolishing the penny so that the nickel would be the lowest-denomination coin?” It turned out that 41% responded in favor of abolishing the penny.

- a) Is this an example of random sampling from a finite population or from an ongoing process? Explain briefly.
- b) Identify the parameter of interest, both in words and with a symbol.
- c) Verify the conditions for using the Wald ( $z$ -) procedure to determine a confidence interval based on the sample result. Then calculate this confidence interval by hand, using the 99% confidence level. Also interpret what this interval means.
- d) Suppose that you want to conduct a study to estimate the population proportion of Cal Poly students who favor abolishing the penny to within  $\pm .04$  with 90% confidence. Determine the smallest sample size that would achieve this goal. [*Hint*: Use the sample proportion from the Harris poll in determining this sample size.]
- e) Would your answer to d) depend upon whether the population of interest was all American adults or all California adults? Explain.

Now suppose that you want to use a random sample of 250 Cal Poly students to test whether less than half of all Cal Poly students favor abolishing the penny, using the  $\alpha = .05$  significance level.

- f) State the appropriate null and alternative hypotheses, in symbols.
- g) Based on the normal approximation, determine the values of the sample proportion that would lead to rejecting the null hypothesis at the  $\alpha = .05$  significance level. Justify your answer with appropriate calculations and/or graphs, perhaps including computer output.
- h) Again using the normal approximation, determine the power of this test when the actual proportion of Cal Poly students who favor abolishing the penny is .45. Justify your answer with appropriate calculations and/or graphs, perhaps including computer output.