

**This assignment is due at the beginning of class on Tuesday, December 2, 2008. Late assignments will not be accepted.** You must submit solutions to all problems, answering them using complete sentences.

YOUR ASSIGNMENT MUST BE STAPLED AND PROBLEM NUMBERS CLEARLY LABELLED. UNSTAPLED ASSIGNMENTS WILL NOT BE ACCEPTED! DO NOT CROWD YOUR WORK. DO NOT WRITE IN MULTIPLE COLUMNS.

1. Exercise 22.40 on page 540.
2. Exercise 21.22 on page 526. (Use the plus four method for your confidence interval. Answer part (c) using a significance test.)
3. A simple random sample of Internet users found that 736 out of 981 teenagers (ages 12 to 17) use instant messaging online, whereas 511 out of 1217 adults (ages 18 and older) use instant messaging online.
  - (a) Construct a 96% confidence interval using the plus four method for the true difference between the proportion of teenagers and the proportion of adults who use instant messaging online.
  - (b) Does this data provide significant evidence at the  $\alpha = 2\%$  level that the proportion of teenagers who use instant messaging online is greater than the proportion of adults who use instant messaging online? Answer this question by performing an appropriate hypothesis test?
4. In the summer, a large number of birds live at Wascana Lake. A biologist is interested in estimating  $p$ , the proportion of those birds that are Canada Geese. The biologist has a budget of \$1500 and estimates that it costs \$5 to carefully observe one bird. (These costs include fixed costs such as a vehicle and fuel, as well as variable costs such as salaries paid to the student observer.)
  - (a) Assuming that the biologist has no prior guess at what the proportion of Canada geese at Wascana Lake truly is (so that  $p^* = 0.50$ ), does the biologist's budget allow him to estimate  $p$  with a margin of error of at most 0.01 at the 95% confidence level?
  - (b) Suppose, instead, that the biologist does a quick visual scan from his office window and notices that about three-quarters of Wascana Lake birds are Canada geese (so that  $p^* = 0.75$ ). Does the biologist's budget now allow him to estimate  $p$  with a margin of error of at most 0.01 at the 95% confidence level?
  - (c) Repeat the calculations from (a) and (b) assuming that the biologist will be satisfied with a margin of error of at most 0.05.