1.) 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.

2.) A survey of a random sample of 1,045 young adults found that 60 percent do not have a landline telephone number. A hypothesis test will be used to determine whether the data provide convincing statistical evidence that more than 50 percent of all young adults do not have a landline telephone number. Which of the following is the test statistic for the appropriate test?

(A) $\dfrac{0.50 - 0.60}{\sqrt{\dfrac{(0.50)(0.50)}{1,045}}}$

(B) $\dfrac{0.50 - 0.60}{\sqrt{\dfrac{(0.40)(0.60)}{1,045}}}$

(C) $\dfrac{0.60 - 0.50}{\sqrt{\dfrac{(0.50)(0.50)}{1,045}}}$

(D) $\dfrac{0.60 - 0.50}{\sqrt{\dfrac{(0.40)(0.60)}{1,045}}}$

(E) $\dfrac{0.60 - 0.50}{\dfrac{(0.40)(0.60)}{\sqrt{1,045}}}$

3.) A recent report stated that less than 35 percent of the adult residents in a certain city will be able to pass a physical fitness test. Consequently, the city's Recreation Department is trying to convince the City Council to fund more physical fitness programs. The council is facing budget constraints and is skeptical of the report. The council will fund more physical fitness programs only if the Recreation Department can provide convincing evidence that the report is true. The Recreation Department plans to collect data from a sample of 185 adult residents in the city. A test of significance will be conducted at a significance level of $a = 0.05$ for the following hypotheses.

$H_0 : p = 0.35$ $H_a : p < 0.35$,

where p is the proportion of adult residents in the city who are able to pass the physical fitness test.

(a) The Recreation Department recruits 185 adult residents who volunteer to take the physical fitness test. The test is passed by 77 of the 185 volunteers, resulting in a p-value of 0.97 for the hypotheses stated above. If it was reasonable to conduct a test of significance for the hypotheses stated above using the data collected from the 185 volunteers, what would the p-value of 0.97 lead you to conclude?

(b) Describe the primary flaw in the study described in part (a), and explain why it is a concern.

4.) Some boxes of a certain brand of breakfast cereal include a voucher for a free digital movie inside of the box. The company that makes the cereal claims that a voucher can be found in 20% of the boxes. However, based on their experiences eating this cereal at home, a group of students believes that the proportion of boxes with vouchers is less than 0.2. This group of students purchased 65 boxes of the cereal to investigate the company's claim.

(a) Write the appropriate statement and hypotheses for a one-sample z-test at a 0.05 significance level.

(b) Check the conditions for inference.

(c) The students found a total of 11 vouchers for a free digital movie in the 65 boxes. Based on this sample, is there support for the students claim? Provide statistical evidence to support your answer.