MATH 365 TEST NO. 2 (4/13/07)

Answer all the questions and justify your answers.

1) In order to estimate the response rate for a new questionnaire with high accuracy, a company decides to run a two stage experiment. First they estimate the proportion with a pilot sample of 50 and then they use this estimate to determine the size of a sample that would result in a 98% confidence interval of width .02. If 13 of the pilot sample respond, what sample size will yield the required confidence interval?

2) 25 pea cans manufactured by Crying Giant company are opened and their mean net contents are weighed. Find a 95% confidence interval for the mean net weight of this company’s cans if the sample mean was 13.9 ounces and the sample standard deviation was .3 ounce.
3) In the past the rate of response of customers to a company’s annual questionnaire has hovered around 30%. In order to improve on this rate the company now offers all responders a voucher worth $1. In the event, of the 1500 customers who were contacted, 500 responded. Decide, at the 98% confidence level, whether the voucher made a difference in the response rate.

4) 75 pea cans manufactured by Laughing Giant company are opened and their mean net contents are weighed. Find a 95% confidence interval for the mean net weight of this company’s cans if the sample mean was 13.9 ounces and the sample standard deviation was .3 ounce.
5) The Fat Giant company’s pea cans state that their net weight is 16 ounces. A random sample of 30 cans are opened and their mean weight turns out to be 16.2 ounces with a sample standard deviation of .5 ounce. Find the \( p \)-value of this test. For each of the values \( \alpha = .10, \alpha = .05, \alpha = .02, \alpha = .01 \) decide whether the test is significant.
6) The Food and Drug Agency has received credible complaints that the pea cans manufactured by the Skinny Giant company contain considerably less than the advertised 15 ounces. In order to test the validity of these complaints, the agency opens 45 cans and finds that the sample’s mean weight is 14.9 ounces with a standard deviation of .3 ounces.

a) Draw a conclusion at the 95% confidence level.

b) What is the \( p \)-value of this test.
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3) In order to estimate the response rate for a new questionnaire with high accuracy, a company decides to run a two stage experiment. First they estimate the proportion with a pilot sample of 50 and then they use this estimate to determine the size of a sample that would result in a 98% confidence interval of width .02. If 13 of the pilot sample respond, what sample size will yield the required confidence interval?

4) 25 pea cans manufactured by Laughing Giant company are opened and their mean net contents are weighed. Find a 95% confidence interval for the mean net weight of this company’s cans if the sample mean was 13.9 ounces and the sample standard deviation was .3 ounce.
5) The Food and Drug Agency has received credible complaints that the pea cans manufactured by the Skinny Giant company contain considerably less than the advertised 15 ounces. In order to test the validity of these complaints, the agency opens 45 cans and finds that the sample’s mean weight is 14.9 ounces with a standard deviation of .3 ounces.

   a) Draw a conclusion at the 95% confidence level.

   b) What is the $p$-value of this test.
6) The Fat Giant company’s pea cans state that their net weight is 16 ounces. A random sample of 30 cans are opened and their mean weight turns out to be 16.2 ounces with a sample standard deviation of .5 ounce. Find the p-value of this test. For each of the values $\alpha = .10, \alpha = .05, \alpha = .02, \alpha = .01$ decide whether the test is significant.