

Name : _____

Directions: This exam contains four problems worth a total of 100 points. For each computational problem, you must first write the formula to be used and present all your subsequent work in order to receive full or partial credit. Circle your final answers.

1. Research suggests that nowadays people read newspapers only occasionally. In a small study, only 34 of the 200 respondents said that they read at least one newspaper everyday.
 - (a) With an alpha level of .05, conduct a test to determine whether the true proportion of the people who read newspapers everyday is less than .20. (10 pts.)

H_0 : _____ vs. H_a : _____

Compute the test statistic and define the rejection rule.

Should the null hypothesis be rejected? Circle one. Yes No

- (b) In the aforementioned study, $34/200 = .17$ proportion of the people read newspapers everyday. How large a sample must be taken in order for the estimated proportion to be within .05 of the true value with 99% certainty? (10 pts.)
 - (c) Repeat (b) but assume that no information is available about the proportion of the people who read newspapers everyday. (10 pts.)

2. As a way to compensate its employees for unused sick days, a company pays each employee a bonus of one-half the usual wage earned for each unused sick day. For all employees in this company, the mean number of sick days used is 7 days with a standard deviation of 2 days. Suppose that a random sample of 100 employees will be selected and, for each employee, the number of sick days used will be obtained.

(a) What will the mean and the standard deviation of the sample mean number of sick days used be? Give specific values. (10 pts.)

(b) Compute the probability that the sample mean will be less than 6.5. (10 pts.)

3. The mean weight of a random sample of nineteen 4-pound potato bags was found to be 4.07 pounds with a standard deviation of 0.16. Assume that the weights of the bags are approximately normally distributed.

(a) Estimate the true mean weight of the 4-pound potato bags using a 98% confidence interval. (10 pts.)

(b) What does the confidence interval obtained in (a) tell you about the “accuracy” of the label (i. e., net weight = 4 pounds)? Explain. (10 pts.)

4. The manager of a recreational park was interested in estimating the mean number of visitors per day. On randomly chosen 60 days, the numbers of visitors were recorded. The sample mean was 123.7. Assume that the standard deviation is known to be 12.6.

- (a) Conduct a test of hypotheses to determine whether the true mean daily number of visitors differs from 120.0. Use $\alpha = .05$. (10 pts.)

H_0 : _____ vs. H_a : _____

Compute the test statistic and define the rejection rule.

Should the null hypothesis be rejected? Circle one. Yes No

- (b) Regardless of what you actually computed, suppose that the test statistic for the test in (a) was $z^* = 2.25$. Compute the p -value of the test. (10 pts.)

- (c) The test in (a) *should* reject the null hypothesis. If the same test were conducted at $\alpha = .10$, would it reject or retain the null hypothesis? Explain. (10 pts.)