

Name: _____

Directions: This exam contains five 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. The owner of a restaurant claims that the average number of customers dining at her restaurant is more than 120 per day. To determine whether this claim is true, numbers of customers were observed for a period of 60 days (assume that these constitute a random sample). The mean number of customers was 126.4 with a standard deviation of 16.2. What conclusion should we reach? Conduct a test at the significance level of .01. (15 pts.)

H_0 : _____ vs. H_a : _____

Compute the test statistic and approximate the p -value.

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

2. At a factory, the actual numbers of work hours for its employees per day have a skewed distribution with mean $\mu = 7.6$ and standard deviation $\sigma = 0.3$. Suppose that you take a random sample of 40 workers from this factory. What is the probability that the sample mean number of work hours will exceed 7.5? (15 pts.)

3. The administrators of a college wish to estimate the proportion of their students who are regular smokers. They plan on distributing a survey to a random sample of students and compute the proportion of regular smokers.

(a) The administrators want their estimate of the proportion of regular smokers to be within .04 of the true value with 95% certainty. To how many students should they distribute the survey? (10 pts.)

(b) Repeat (a) but assume that the administrators believe that the proportion of regular smokers is about .30. (10 pts.)

4. According to a poll, based on a random sample of 1,000 people interviewed, the proportion of the Americans who approved Obama's administration was .68. Conduct a test to determine whether the true proportion of the Americans who support Obama's administration differs from .70. Use $\alpha = .10$. (15 pts.)

H_0 : _____ vs. H_a : _____

Compute the test statistic and the p -value.

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

5. A realtor wishes to know the average house price in the suburbs of a large metropolitan city. He collected prices (in thousand dollars) for a random sample of 35 houses. The mean price was 287.4 with a standard deviation of 70.1.

(a) Estimate the true mean house price using a 95% confidence interval. (15 pts.)

(b) What does the obtained confidence interval in (a) tell you about the claim that mean house price in the suburbs is over 250 thousand dollars? Explain. (10 pts.)

(c) In order for the estimate of the mean house price in the suburbs to be within 20 thousand dollars of the true value with 95% certainty, how large a sample is needed? (10 pts.)