

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. According to a survey conducted with a random sample of 500 people, 72% said that the new administration's primary focus should be bringing the nation's economy back on track. Conduct a test to determine whether the corresponding true percentage is less than 75. Use a Type I error rate of .01. (14 pts.)

H_0 : _____ vs. H_a : _____

Compute the test statistic and calculate the p -value.

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

2. Number of hours working outside each day for workers at a construction company has a skewed distribution with a mean of 5.9 hours with a standard deviation of 0.6. Suppose that you will take a random sample of 40 workers from this company and compute the sample mean number of hours working outside.

(a) What distribution does the sample mean have in this situation, and what theorem assures such a result? (6 pts.)

(b) Find the probability that the sample mean will be less than 6.0 hours. (12 pts.)

3. A researcher wishes to estimate the proportion of the people who talk on their cell phones while driving. The researcher intends to obtain a random sample of people and ask them whether they talk and drive at the same time at least once a week.
- (a) If the researcher needs her estimate of the proportion of interest to be within .04 of the true value with 90% certainty, how many people should be surveyed?
 Note: To answer this question, do not use information from (b) below. (10 pts.)
- (b) Of the 390 people surveyed, 268 said that they would talk and drive at the same time at least once a week. Estimate the proportion of the people who talk and drive using a 90% confidence interval. (12 pts.)
4. It is conjectured that the average life of a particular type of a light bulb is 750 hours. To determine whether this conjecture is supported, a random sample of 50 light bulbs were tested for longevities. The mean life was 763 hours with a standard deviation of 29. With an alpha level of .01, what conclusion should be drawn? (14 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

5. A random sample of 70 people showed that the mean household income was \$51,250 with a standard deviation of \$10,800.

(a) Find a 95% confidence interval for the true mean household income. (12 pts.)

(b) Based on your answer in (a), can you conclude that the true mean household income is over \$50,000? Explain. (10 pts.)

(c) How many people should be surveyed in order for the estimate of the mean household income to be within \$2,000 of the true value with 95% certainty? (10 pts.)