

PRACTICE TEST 2 FALL 2009

1. (3 points) In a large population of college-educated adults, the mean IQ is 118 with a standard deviation of 20. Suppose 200 adults from this population are randomly selected for a market research campaign. The distribution of the sample mean IQ is
 - a. Exactly normal, mean 118, standard deviation 20.
 - b. Approximately normal, mean 118, standard deviation 1.414.
 - c. Approximately normal, mean 118, standard deviation 0.1.
 - d. Approximately normal, mean equal to the observed value of the sample mean, standard deviation 20.

2. (3 points) Which sample size will give the largest standard deviation of \bar{x} ?
 - a. 35
 - b. 100
 - c. Both will be the same

3. (3 points) I computed a 95% confidence interval for the mean lifetime of a set of tires as (37,000, 42,000). Based on this interval, I know
 - a. The margin of error is 5000 miles.
 - b. The sample mean \bar{x} is 39,500 miles.
 - c. Nothing.
4. (3 points) In formulating hypotheses for a statistical test of significance, the null hypothesis is often
 - a. The probability of observing the data you actually obtained.
 - b. A statement that all the data are 0.
 - c. A statement of “no effect” or “no difference”
 - d. 0.05

5. (3 points) In a statistical test of hypotheses, we fail to reject H_0 if
- P-value $> \alpha$
 - P-value $\leq \alpha$
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6. (3 points) A statistical test of hypotheses is a left tailed test if
- H_a involves $<$
 - H_a involves $>$
 - H_a involves \neq
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7. (3 points) A university administrator obtains a sample of the academic records of past and present scholarship athletes at the university. The administrator reports that no significant difference was found in the mean GPA (grade point average) for male and female scholarship athletes (P-value=0.287). This means
- The GPAs for male and female scholarship athletes are identical except for 28.7% of the athletes.
 - The maximum difference in GPAs between male and female scholarship athletes is 0.287.
 - The chance of obtaining a difference in GPAs between male and female scholarship athletes as large as that observed in the sample if there is no difference in the mean GPAs is 0.287
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8. Use the 68-95-99.7 rule to determine the appropriate proportions. Draw the distribution shading the appropriate area and compute the value. Suppose test scores have a normal distribution with a mean of 82 and a standard deviation of 4.

a. What proportion of scores is between 74 and 90?

b. What proportion of scores is above 94?

c. What proportion of scores is between 76 and 90?

d. The lowest 16% of scores are lower than what value?

9.

3. Birth weights at a local hospital have a normal distribution with a mean of 110 oz. and a standard deviation of 15 oz. Use this information to answer the following questions. Draw the area corresponding to the proportions and write your answer as a complete sentence.

a. (6 points) What proportion of infants has a birth weight that is less than 138 oz.?

b. (6 points) What proportion of infants has a birth weight that is between 127 oz. and 141 oz.?

c. (6 points) What proportion of infants has a birth weight that is at least 131 oz.?

11. Suppose you are running a one sample t-test with the two hypotheses: $H_0:\mu=240$ and $H_a:\mu<240$ and you obtain a sample of 101 subjects and find that they have a mean value of $\bar{x} = 238.5$ with a standard deviation of $\sigma=8$. Find the value of the test statistic.

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12. A sample of six college wrestlers had an average weight of 276 pounds with a population standard deviation of 12 pounds.
- (10 points) Find the 99% confidence interval of the true mean weight of all college wrestlers. Show the formula used and show all of the values plugged in. You may then use the calculator for the overall computation.
 - (4 points) In a complete sentence, give an interpretation of the confidence interval.
 - (3 points) If a coach claimed that the average weight of the wrestlers on his team was 310 would the claim be believable?

13. A researcher wishes to test the claim that the average age of lifeguards in Ocean City is greater than 24 years. She selects a sample of 36 guards and finds the mean of the sample to be 24.7 years. Suppose the standard deviation of the population is 2 years. Is there evidence to support the claim? Run the test. Be sure to clearly show all 5 steps. Show the calculation of the test statistic and be sure to state your conclusion in the context of the problem. You may use your calculator to run the test.