Hypothesis Tests/Confidence Intervals Word Problems

- 1. A government agency reports a confidence interval of (26.2, 30.1) when estimating the mean commute time (in minutes) for the population of workers in a city. Find the sample mean and the estimated margin of error.
- 2. From a random sample of 36 business days, the mean closing price of Apple stock was \$116.16. Assume the standard deviation is \$10.27. Construct a 90% and 95% confidence interval for the population mean. Interpret the results and compare the widths of the confidence intervals.
- 3. $\mu < 128$ is a claim as part of a hypothesis test. Would it have to be a null hypothesis or an alternative hypothesis? Why?
- 4. An urban planner claims that the noontime mean traffic flow rate on a busy downtown college campus street is 35 cars per minute. Describe type I and type II errors for a hypothesis test of this claim.
- 5. A medical research team is investigating the mean cost of a 30-day supply of a heart medication. A pharmaceutical company thinks that the mean cost is less than \$60. You want to support this claim. How would you write the null and alternative hypothesis?
- 6. Find the P-value for the hypothesis test with a standardized test statistic *z*. Decide whether to reject the null hypothesis for the level of significance α .
 - a. Left-tailed test, z = -1.32, $\alpha = 0.10$
 - b. Right-tailed test, z = 2.46, $\alpha = 0.01$
 - c. Two-tailed test, z = -1.68, $\alpha = 0.05$

- 7. The two intervals (114.4, 115.6) and (114.1, 115.9) are confidence intervals computed using the same sample data.
 - a. What is the value of the sample mean? (Hint: Where is the confidence interval centered?)
 - b. The confidence level for one of the intervals is 90% and the other is 99%. Which is which, and how can you tell?
- 8. Consider the following statement for a 95% confidence interval (7.8, 9.4): There is a 95% chance that μ is between 7.8 and 9.4. Is this statement correct? Why or why not?
- 9. For the following pairs, indicate which do not comply with the rules for setting up hypotheses, and explain why:
 - a. $H_o: \mu = 15, H_a: \mu = 15$
 - b. $H_o: \mu = 123, H_a: \mu < 123$
 - c. $H_o: \mu = 123, H_a: \mu = 125$
- 10. For each pair of P-value and significance level, state whether you would reject the null hypothesis:
 - a. P-value = .084, $\alpha = .05$
 - b. P-value = .003, $\alpha = .001$
 - c. P-value = .489, α = .05
 - d. P-value = .084, $\alpha = .10$
 - e. P-value = $.039, \alpha = .01$
 - f. P-value = .218, α = .10
- 11. The standard deviation for a population is 12.6. A sample of 36 observations selected from this population has a mean equal to 74.8. Construct a 90%, 95%, and a 99% confidence interval for μ .
- 12. According to the U.S. National Center for Health Statistics, the mean hospital stay for delivery of a baby was 2.4 days in 1993. A recently taken random sample of 150 births found a mean hospital stay of 2.2 days with a standard deviation of .9 days. Find the P-value for the hypothesis test with the alternative hypothesis that the current mean time in the hospital for childbirth is less than 2.4 days.