ap Hw#8 P.541#1,6,13,16,26,30,34

Note Title 1/5/2017

- t-models, part I. Using the t tables, software, or a calculator, estimate
 - a) the critical value of t for a 90% confidence interval with df = 17.
 - b) the critical value of t for a 98% confidence interval with df = 88.
 - c) the P-value for $t \ge 2.09$ with 4 degrees of freedom.
 - d) the P-value for |t| > 1.78 with 22 degrees of freedom.
- **6. Teachers.** Software analysis of the salaries of a random sample of 288 Nevada teachers produced the confidence interval shown below. Which conclusion is correct? What's wrong with the others?

t-Interval for μ : with 90.00% Confidence, 38944 < μ (TchPay) < 42893

- a) If we took many random samples of Nevada teachers, about 9 out of 10 of them would produce this confidence interval.
- b) If we took many random samples of Nevada teachers, about 9 out of 10 of them would produce a confidence interval that contained the mean salary of all Nevada teachers.
- c) About 9 out of 10 Nevada teachers earn between \$38,944 and \$42,893.
- d) About 9 out of 10 of the teachers surveyed earn between \$38,944 and \$42,893.
- e) We are 90% confident that the average teacher salary in the United States is between \$38,944 and \$42,893.
- **13. Normal temperatures, part II.** Consider again the statistics about human body temperature in Exercise 11.
 - a) Would a 90% confidence interval be wider or narrower than the 98% confidence interval you calculated before? Explain. (You should not need to compute the new interval.)
 - b) What are the advantages and disadvantages of the 98% confidence interval?
 - c) If we conduct further research, this time using a sample of 500 adults, how would you expect the 98% confidence interval to change? Explain.
- **15. Hot dogs.** A nutrition laboratory tests 40 "reduced sodium" hot dogs, finding that the mean sodium content is 310 mg, with a standard deviation of 36 mg.
 - a) Find a 95% confidence interval for the mean sodium content of this brand of hot dog.
 - b) What assumptions have you made in this inference? Are the appropriate conditions satisfied?
 - c) Explain clearly what your interval means.

- **26. Fuel economy.** A company with a large fleet of cars hopes to keep gasoline costs down, and sets a goal of attaining a fleet average of at least 26 miles per gallon. To see if the goal is being met, they check the gasoline usage for 50 company trips chosen at random, finding a mean of 25.02 mpg and a standard deviation of 4.83 mpg. Is this strong evidence that they have failed to attain their fuel economy goal?
 - a) Write appropriate hypotheses.
 - b) Are the necessary assumptions to perform inference satisfied?
 - Describe the sampling distribution model of mean fuel economy for samples like this.
 - d) Find the P-value.
 - e) Explain what the P-value means in this context.
 - f) State an appropriate conclusion.
- **30. Ski wax.** Bjork Larsen was trying to decide whether to use a new racing wax for cross-country skis. He decided that the wax would be worth the price if he could average less than 55 seconds on a course he knew well, so he planned to test the wax by racing on the course 8 times.
 - a) Suppose that he eventually decides not to buy the wax, but it really would lower his average time to below 55 seconds. What kind of error would he have made?
 - b) His 8 race times were: 56.3, 65.9, 50.5, 52.4, 46.5, 57.8, 52.2, and 43.2 seconds. Should he buy the wax? Explain.
- **34. Yogurt.** *Consumer Reports* tested 14 brands of vanilla yogurt and found the following numbers of calories per serving:

160	200	220	230	120	180	140
130	170	190	80	120	100	170

- a) Check the assumptions and conditions for inference.
- b) Create a 95% confidence interval for the average calorie content of vanilla yogurt.
- c) A diet guide claims that you will get 120 calories from a serving of vanilla yogurt. What does this evidence indicate? Use your confidence interval to test an appropriate hypothesis and state your conclusion.