Tutorial 10

7.54 Refer to data in Exercise 7.3 on the labor time required to produce an order of automobile mufflers using a heavy stamping machine. The times (hours) for $n = 52$ orders of different parts has $\bar{x} = 1.865$ hours and $s^2 = 1.5623$, so $s = 1.250$ hours.

(a) Conduct a test of hypotheses with the intent of showing that the mean labor time is more than 1.5 hours. Take $\alpha = 0.05$.

(b) Based on your conclusion in part (a), what error could you have made? Explain in the context of the problem.

7.55 Refer to Exercise 7.5, where the number of unremovable defects, for each of $n = 45$ displays, has $\bar{x} = 2.667$ and $s = 3.057$ unremovable defects.

(a) Conduct a test of hypotheses with the intent of showing that the mean number of unremovable defects is less than 3.6. Take $\alpha = 0.025$.

(b) Based on your conclusion in part (a), what error could you have made? Explain in the context of the problem.

7.57 Refer to Exercise 7.14, where $n = 9$ measurements were made on a key performance indicator.

123 106 114 128 113 109 120 102 111

(a) Conduct a test of hypotheses with the intent of showing that the mean key performance indicator is different from 107. Take $\alpha = 0.05$ and assume a normal population.

(b) Based on your conclusion in part (a), what error could you have made? Explain in the context of the problem.

Tutorial 10

7.59 Refer to Exercise 2.34, page 36, concerning material costs for rebuilding $n = 29$ traction motors. A computer calculation gives $\bar{x} = 1.4707$ and $s = 0.5235$ thousand dollars. At the 0.05 level of significance, conduct a test of hypotheses with the intent of showing the mean is greater than 1.3 thousand dollars.

7.60 In 64 randomly selected hours of production, the mean and the standard deviation of the number of acceptable pieces produced by a automatic stamping machine are $\bar{x} = 1.038$ and $s = 146$. At the 0.05 level of significance, does this enable us to reject the null hypothesis $\mu = 1.000$ against the alternative hypothesis $\mu > 1.000$?

7.61 With reference to the thickness measurements in Exercise 2.41, test the null hypothesis that $\mu = 30.0$ versus a two-sided alternative. Take $\alpha = 0.05$.

7.63 A manufacturer claims that the average tar content of a certain kind of cigarette is $\mu = 14.0$. In an attempt to show that it differs from this value, five measurements are made of the tar content (mg per cigarette):

14.5 14.2 14.4 14.3 14.6

Show that the difference between the mean of this sample, $\bar{x} = 14.4$, and the average tar claimed by the manufacturer, $\mu = 14.0$, is significant at $\alpha = 0.05$. Assume normality.

Tutorial 10

Refer to the nonopillar height data on page 15. Using the 95% confidence interval, based on the t distribution, for the mean nanopillar height

N	Mean	StDev	SE Mean	95% CI
50	305.580	36.971	5.229	(295.073, 316.087)

(a) decide whether or not to reject $H_0 : \mu = 320$ nm in favor of $H_1 : \mu \neq 320$ at $\alpha = 0.05$;

(b) decide whether or not to reject $H_0 : \mu = 310$ nm in favor of $H_1 : \mu \neq 310$ at $\alpha = 0.05$.

(c) What is your decision in part (b) if $\alpha = 0.02$? Explain.