

**Homework 9**

Due Tuesday, November 18

1. A sample of 40 independent readings on the voltage for this circuit gave a sample mean 128.6 and standard deviation 4.2. The hypothesis is that the average output voltage is 130 against the alternative that it is less than 130. Find the  $p$ -value for this test.
2. Find the  $p$ -values for (a) HW 7, Problem 3; and (b) HW 7, Problem 11
3. A random sample of 500 measurements on the length of stay in hospitals had sample mean 5.4 days and sample standard deviation 3.1 days. For the hypothesis that the length of stay is 5 days (or less) versus the alternative that it is in excess of 5 days, find the  $p$ -value.
4. Find the  $p$ -values for (a) HW 8, Problem 4; (b) HW 8, Problem 6; and (c) HW 8, Problem 8.
5. Find the  $p$ -values for (a) HW 8, Problem 10, Part (c); and (b) HW 8, Problem 11, Part (b).
6. A sample of 40 independent readings on the voltage for this circuit gave a sample mean 128.6 and standard deviation 2.1. Find a 95% confidence interval for the average voltage.
7. One suggested method for solving the electric-power shortage in a region involves constructing floating nuclear power plants a few miles offshore in the ocean. Concern about the possibility of a ship collision with the floating (but anchored) plant has raised the need for an estimate of the density of ship traffic in the area. The number of ships passing within 10 miles of the proposed power-plant location per day, recorded for  $n = 60$  days during July and August, possessed a sample mean and variance of 7.2 and 8.8, respectively. Find a 95% confidence interval for the mean number of ships passing within 10 miles of the proposed power-plant location during a 1-day time period.
8. Although there are many treatments for bulimia nervosa, some subjects fail to benefit from treatment. In a study to determine which factors predict who will benefit from treatment, researchers have found that self-esteem was one of the important predictors. The mean and standard deviation of post treatment self-esteem scores for  $n = 21$  subjects were  $\bar{Y} = 26.6$  and  $S = 7.4$ , respectively. Find a 95% confidence interval for the true post treatment self-esteem scores.
9. The following table lists the typical cost of repairing the bumper of a moderately priced midsize car damaged by a corner collision at 3 mph. Use these observations to construct a 95% confidence interval for the true average repair cost for all such automobiles with similar damage.

|        |        |        |        |        |        |        |        |
|--------|--------|--------|--------|--------|--------|--------|--------|
| \$1019 | \$1090 | \$1109 | \$1235 | \$1275 | \$1361 | \$1437 | \$1446 |
| \$1461 | \$1525 | \$1670 | \$1685 | \$1783 | \$1787 | \$1889 | \$2484 |

10. Solid copper produced by sintering (heating without melting) a powder under specified environmental conditions is then measured for porosity (the volume fraction due to voids) in a laboratory. A sample of  $n_1 = 4$  independent porosity measurements have mean  $\bar{Y}_1 = 0.22$  and variance  $S_1^2 = 0.0010$ . A second laboratory repeats the same process on solid copper formed from an identical powder and gets  $n_2 = 5$  independent porosity measurements with  $\bar{Y}_2 = 0.17$  and  $S_2^2 = 0.0020$ . Estimate the interval of the true difference between the population means for these two laboratories, with confidence coefficient 0.95.
11. Find the 90% confidence interval about  $\mu$  for `town.250.txt` data (se HW 7, Problem 3).
12. Find the 95% confidence interval about  $\sigma^2$  for `sleep` data (see HW 8, Problem 11, Part (a)).