Statistics for the Life Sciences

Math 20340 Section 01, Fall 2009

Homework 11 Solutions

- **10.35**:
  - **a**: The p-value is between 2% and 5%; so the difference is significant (we reject H_0 at 5%) but not highly so (we do not reject H_0 at 1%)
  - **b**: $(0.014, .586)$
  - **c**: We would need at least 62 pairs (assuming s_d^2 stays at .16)
- **10.40**: The description seems to suggests a one-tailed test, but part a) seems instead to ask for a two-tailed test; I've done both.
  - **a**: $\mu_d = -16.77$ (taking Albertsons$-$Ralphs); $s_d = 11.18$. Assuming differences are normally distributed, test statistic (which has value -2.998) is a t distribution with 3 d.o.f.

    The critical values are $t_{.05} = 2.353.t_{.025} = 3.182$. So, if we are doing the two-tailed test $H_0 : \mu_d = 0$ against $H_a : \mu_d \neq 0$, the results are not significant; but if we are doing the one-tailed test $H_0 : \mu_d = 0$ against $H_a : \mu_d < 0$, the result is significant (we would reject null at 5% but not at 1%).
  - **b**: Two-tailed test: p-value is between 5% and 10%. One-tailed test: p-value is between 2.5% and 5%
  - **c**: $(-49.43, 15.89)$. At 1% significance, can't detect a difference between the averages
- **10.41**:
- **a**: There are two populations: drivers approaching Prohibitive signs, and drivers approaching Permissive signs. A random sample of drivers has been picked, and presented with Prohibitive signs. Then that *same* random sample is presented with Permissive signs. So there is a pairing of the two random samples: first driver in first sample goes with first driver of second sample, etc.
- **b**: The p-value is $< 1\%$, so there is a significant difference
- **c**: $(80.47, 133.32)$