## Solutions to problems from Kelley and Donnelly

**11.41** This problem requires a one-tailed dependent samples t test with $\alpha = 0.05$.

- null hypothesis: the mean difference in scores (post-test minus pre-test) is not greater than zero: $\mu_D \leq 0$

- alternative hypothesis: the mean difference in scores is greater than zero: $\mu_D > 0$

- sample of difference scores: 7, 6, 7, 8, 0, 2, -6

- sample mean: $\bar{D} = 3.4286$

- sample standard deviation: $s_D = 5.0943$

- sample standard error: $s_{\bar{D}} = s_D/\sqrt{n} = 5.0943/\sqrt{7} = 1.9255$

- t value: $t = \bar{D}/s_{\bar{D}} = 3.4286/1.9255 = 1.7806$

- degrees of freedom: $df = n - 1 = 6$

- critical t value (one-tailed, $\alpha = 0.05$, $df = 6$): from Appendix B, $t_c = 1.943$

In this one-tailed problem we are testing for an unusually high t value. The t value is not greater than $t_c$, so we do not reject the null hypothesis. There is not strong evidence that the instruction program improved students' scores on the standardized test.

**11.43** This problem requires a two-tailed dependent samples t test with $\alpha = 0.10$.

- null hypothesis: the mean difference in scores is zero: $\mu_D = 0$

- alternative hypothesis: the mean difference in scores is not zero: $\mu_D \neq 0$

- sample of difference scores: -8, 8, 8, 35, -3, 14, -5, 28

- sample mean: $\bar{D} = 9.6250$

- sample standard deviation: $s_D = 15.5374$

- sample standard error: $s_{\bar{D}} = s_D/\sqrt{n} = 15.5374/\sqrt{8} = 5.4933$

- t value: $t = \bar{D}/s_{\bar{D}} = 9.6250/5.4933 = 1.7521$

- degrees of freedom: $df = n - 1 = 7$

- critical t value (two-tailed, $\alpha = 0.10$, $df = 7$): from Appendix B, $t_c = 1.895$

In this two-tailed problem we are testing for an unusually extreme t value in either direction (positive or negative). The t value is not less that $-t_c$ or greater than $t_c$, so we do not reject the null hypothesis. There is not strong evidence that the display location affected sales.