Pledge: *I pledge my honor that I have abided by the Stevens Honor System.*

7.71: p. 468

(a)
There does not seem to be any outliers or any skewness to the samples, therefore, the use of t-procedures is appropriate in this case; however, they do not seem to be normal.

(b)

	Sample size	Mean	Std. Dev.
Neutral	14	0.571	0.730
Sad	17	2.12	1.24

(c)
Consider μ_1 to be the mean of the Neutral group, and μ_2 to be the mean of the Sad group.
$H_0 : \mu_1 = \mu_2$
$H_a : \mu_1 \neq \mu_2$

(d)

$$\begin{aligned} Test\ Statistic &= \frac{0.571 - 2.118}{\sqrt{\frac{0.730^2}{14} - \frac{1.244^2}{17}}} \\ &= -4.30 \\ df &= 26 \\ p - value &= 0.0001 \end{aligned}$$

From these results we can reject the null hypothesis accepting the alternative, the p-value is far smaller than the significance level of 0.05. Furthermore, one can say that there is a significant difference in mean price between the two groups.

(e)

$$95\%\ CI = (0.571 - 2.12) \pm t_{\alpha/2} * \sqrt{\frac{0.730^2}{14} - \frac{1.244^2}{17}}$$

For 95% confidence interval: $(-2.285, -0.808)$

7.89: p. 472

(a)
Let μ_1 is the mean of the Breast-fed group, and μ_2 is the mean of the formula group.
$H_0 : \mu_1 = \mu_2$
$H_a : \mu_1 > \mu_2$

$$s_{combined} = \sqrt{\frac{22 * 1.7^2 + 18 * 1.8^2}{40}}$$
$$= 1.7457$$
$$t = \frac{13.3 - 12.4}{1.7457 * \sqrt{\frac{1}{23} + \frac{1}{19}}}$$
$$= 1.66$$

With these, $p - value = 0.053$, therefore, if provided with a significant level of $\alpha = 0.05$, then it would be concluded that there is no difference between the mean hemoglobin found in breast-fed vs. formula infants. The null hypothesis would fail to be rejected.

(b)
For 95% confidence interval: $(-0.2021, 2.0021)$

(c)
The assumptions required to make part (a) and (b) work is that both samples are considered to be SRS and normal.

7.102: p. 480

(a)
$F = \frac{s_2^2}{s_1^2} = \frac{9.1}{3.5} = 2.6$

(b)
$F(15, 10, 0.05) = 2.845$

(c)
We accept H_0 as 2.6 ¡ 2.845, therefore, we can conclude that the two standard deviations are equal.

7.122: p. 482

(a)
$\overline{x_1} = 49.692$
$s_1 = 2.3179$
$\overline{x_2} = 50.545$
$s_2 = 1.9244$
$df = 17$
$t = \frac{\overline{x}_1 - \overline{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} = -0.90$
$p - value = 0.3831$

(b)
$\overline{d} = -0.853$

$s = 1.2691$
$t = \frac{\bar{d}-\mu_d}{\frac{s_d}{\sqrt{n}}} = -2.13$
$p - value = 0.0625$

(c)
The calculated test statistic values and p-values are different between parts (a) and (b), therefore, this could lead to the accidental acceptance or rejection of H_0.

8.71: p. 524

(a)
$\hat{p}_F = \frac{48}{60} = 0.8$
$SE_F = \sqrt{\frac{0.8*0.2)}{60}} = 0.05164$
$\hat{p}_M = \frac{52}{132} = 0.\overline{39}$
$SE_F = \sqrt{\frac{0.\overline{39}*0.\overline{60})}{132}} = 0.04252$

(b)
For 90% confidence interval: $(0.2960, 0.5161)$
With this, one can assume that the mean difference of the ratio of male to female references falls between these two values.

(c)
$H_0 : \hat{p}_F = \hat{p}_M$
$p = \frac{p_F*n_F+p_M*n)M}{n_F+n_M} = 0.5101$
$SE = \sqrt{p(1-p)(\frac{1}{n_F} + \frac{1}{n_M}} = 0.0778$
$z = \frac{p_F-p_M}{SE} = 5.217$
$P(z > 5.21) \approx 0$

We reject H_0 stating that there is a significant difference.