FINAL REVIEW

4.6-1 $H_0: \mu_0 = \mu_1$ vs. $H_1: \mu_0 \neq \mu_1$

We use the sample variances. $\alpha = 0.05 \rightarrow z(0.025) = 1.96$

$$z = \frac{798 - 826}{\sqrt{\frac{7982}{100} + \frac{9001}{100}}} = -2.15$$

Since $|-2.15| > 1.96 \Rightarrow$ REJECT H_0, ACCEPT H_1

4.6-2 $H_0: \mu_0 = \mu_1$ vs. $H_1: \mu_1 < \mu_2$

$$z = \frac{\bar{\Sigma} - \bar{I}}{\sqrt{\frac{26}{14} - \frac{21}{18}}}$$

We reject H_0 if $z \leq -z(0.026) = -1.96$

4.6-3 $H_0: \mu_S = \mu_A$ vs $H_1: \mu_S > \mu_A$

Use $\alpha = 0.05$. Since $n_1 + n_2 - 2 = 20$, use $t(0.05; 20) = 1.725$

$$T = \frac{82.6 - 78.1}{\sqrt{\frac{9 \cdot 6.52 + 11 \cdot 7.02}{20}\left(\frac{1}{10} - \frac{1}{12}\right)}} = 4.03$$

Since $4.03 > 1.725$, then WE REJECT H_0 and ACCEPT H_1

4.6.5 Paired t-test

We test $H_0: \mu_B - \mu_A = \mu_D = 0$ vs $H_1: \mu_B - \mu_A = \mu_D > 0$

Let $D = B - A$. We find $\bar{D} = 1.4$, $S_D = 2.633$

Test statistic $T = \frac{\bar{D}}{S_D/\sqrt{n}} = \frac{1.4}{2.633/\sqrt{10}} = 1.68$

$t(0.05; 9) = 1.833$

Since T IS NOT larger than 1.833, we ACCEPT H_0

4.6-6 $H_0: p_1 = p_2$ vs $H_1: p_1 < p_2$

we estimate $\hat{p}_1 = \frac{21}{200} = 0.105$, $\hat{p}_2 = \frac{37}{200} = 0.185$

The pooled estimate is $\hat{p} = \frac{58}{400} = 0.145$

TEST STATISTICS $$Z = \frac{0.105 - 0.185}{\sqrt{\frac{(0.145)(0.855)}{200} + \frac{(0.145)(0.855)}{200}}} = -2.27$$

Compare to $-Z(0.05) = -1.645$

Since $Z \leq -1.645$, we REJECT H_0 and ACCEPT H_1

8.1-1 We find $\hat{\beta}_0 = -7.877$, $\hat{\beta}_1 = 0.08676$

$$\hat{Y}_i = -7.877 + 0.08676 X_i$$

8.2-1 $\hat{\beta}_1 = 0.35$ $$s(\hat{\beta}_1) = \sqrt{\frac{MSE}{\sum (x_i - \bar{x})^2}} = \sqrt{\frac{2.3}{100}} = 0.152$$

Confidence Interval $\hat{\beta}_1 \pm t\left(\frac{\alpha}{2}; n-2\right) s(\hat{\beta}_1)$ $\alpha = 0.05$, $n = 16$

$$= 0.35 \pm 2.145 \cdot 0.152$$

$$\rightarrow (0.024, 0.676)$$