MATH1001 Homework Solution

Chapter 10

10.2.4

(a) H_0: The striped and red forms survive equally well
H_A: The red form survives better than does the striped form

(b) H_0: $p_1 = p_2$
H_A: $p_1 < p_2$
where p denotes the probability of survival, 1 denotes striped, and 2 denotes red.

(c-d)

	Striped	Red	Total
Survived	65 (70.31)	23 (17.69)	88
Died	98 (92.69)	18 (23.31)	116
Total	163	41	204

$\chi^2_s = 3.51$; $\hat{p}_1 = 65/163 \approx 0.40$, $\hat{p}_2 = 23/41 \approx 0.56$. With df = 1, Table 9 gives $\chi^2_{0.10} = 2.71$ and $\chi^2_{0.05} = 3.84$, so $0.025 < P < 0.05$.

(e) We reject H_0; there is sufficient evidence ($0.025 < P < 0.05$) to conclude that the red form survives more successfully than does the striped form.

10.5.8

(a) H_0: There is no association between treatment group and condition
H_A: Treatment group and condition are related

(b) The degrees of freedom are $(2 - 1)*(4 - 1) = 3$.

(c) We do not reject H_0. There is little or no evidence (P=0.87) to conclude that treatment group and condition are related.

10.7.3

$\tilde{p}_1$ = 33/107 = 0.3084, $\tilde{p}_2$ = 21/109 = 0.1927

$$SE_{(\tilde{P}_1-\tilde{P}_2)} = \sqrt{\frac{(0.3084)(0.6916)}{107} + \frac{(0.1927)(0.8073)}{109}} = 0 .0585.$$

(0.3084 - 0.1927) ± (1.96)(0.0585)

(0.001,0.230) or $0.001 < p_1 - p_2 < 0.230$.

No; the confidence interval suggests that bed rest may actually be harmful.