

## Homework 12.5 Solutions

#18 (d)  $df: 4 \quad \alpha = 0.01 \Rightarrow CV \text{ of } 13.28$

(e)  $df: 6 \quad \alpha = 0.05 \Rightarrow CV \text{ of } 12.59$

(f)  $df: 9 \quad \alpha = 0.10 \Rightarrow CV \text{ of } 14.68$

#19 (a) p-value  $0.0832 > 0.05$  accept null

(b) p-value  $0.1567 > 0.10$  accept null

(c) p-value  $0.0245 < 0.05$  reject null

(d) p-value  $\rightarrow 0.000453 < 0.01$  reject null

(e)  $\chi^2_{\text{calc}} = 10.23 > 5.99$  reject null

(f)  $\chi^2_{\text{calc}} = 7.881 < 9.488$  accept null

(g)  $\chi^2_{\text{calc}} = 6.630 < 6.635$  accept null

(h)  $\chi^2_{\text{calc}} = 11.5 > 7.779$  reject null

#22  $H_0 =$  Political Affiliation in the US + gender are independent.  
 $H_1 =$  Political Affiliation in the US + gender are NOT independent.

(a)  $CV = 5.991 \quad \chi^2_{\text{calc}} = 5.178$  (using graphing calc)  
 $5.178 < 5.991$   
 accept null hypothesis

(b) Evelyn's hypothesis was my  $H_1$ , so since I am accepting  $H_0$  we do not have enough evidence to support  $H_1$ .

(c)  $CV = 4.605 \quad \chi^2_{\text{calc}} = 5.178$  (same as before)  
 $5.178 > 4.605$   
 reject null hypothesis (do not accept)

(d) Since we rejected  $H_0$  we would accept  $H_1$ , so yes.

#23  $H_0$  = The transmission type of a car & the age of owner is independent.

$H_1$  = The transmission type of a car & the age of owner is not independent.

(a) Since we are not given a CV (critical value), use the p-value & the significance level...

$p = 0.0248$       Since  $0.0248 > 0.01$   
1% sig. level  $\Rightarrow \alpha = 0.01$       Accept null hypothesis

(b) Amy's hypothesis was the  $H_0$ . Since we are accepting it, yes.

(c) p-value = 0.0248 (same)      Since  $0.0248 < 0.05$   
5% sig level  $\Rightarrow \alpha = 0.05$       reject (do not accept) null hypothesis

(d) Since we rejected  $H_0$  (which was her hypothesis) ... no.

#24 (a) (i) ~~male~~ male blue:  $\frac{225 \left( \frac{103}{225} \right) \left( \frac{82}{225} \right)}{225} = \frac{(103 \cdot 82)}{225} = 37.5$   
(ii) g = male green:  $\frac{(103 \cdot 59)}{225} = 27.0$   
r = female blue:  $\frac{(122 \cdot 82)}{225} = 44.5$   
s = female green:  $\frac{(122 \cdot 59)}{225} = 32.0$

(b) (i)  $H_0$  = Gender & most popular m+m candy color is independent.

(ii)  $H_1$  = Gender & most popular m+m candy color is not independent.

(c) (i) 2 rows 4 columns degrees of freedom:  $(2-1)(4-1) = (1)(3) = 3$

(ii) CV = 7.815       $\chi^2_{calc} = 4.896$

(d)  $4.896 < 7.815$  so do not reject  $H_0$ .