Some answers for our Long Exam #4

1. **a.** $H_0 : p_D = .40, p_C = .30, p_S = .30.$
   $H_1 : Not H_0.$

   b. Reject H_0 if $X^2_{\text{obs}} > 5.99$

   c. $E_D = 45.2, E_C = 33.9, E_S = 33.9$

   d. $X^2_{\text{obs}} = 6.17$

   e. Reject H_0. Therefore, we found enough evidence to say that the proportions of major sports facilities in downtown, central city, and suburban areas are not the same as in 1985.

2. **a.** H_0 : Getting headache is independent of the amount of atorvastatin used.
   H_1 : Getting headache is dependent on the amount of atorvastatin used.

   b. Reject H_0 if $X^2_{\text{obs}} > 11.344$

   c. $X^2_{\text{obs}} \approx 1.2$

   d. No, we don't reject the null hypothesis. That is, we did not find evidence to indicate that the amount of atorvastatin used affects the occurrence of headaches.

3. **a.** $H_0 : \mu_A = \mu_B = \mu_C = \mu_D.$
   H_A : Not all are equal.
   μ_i = mean distance traveled by brand i golf balls, $i = A, B, C, D.$

   b. $SSG = 3071.67$, $SSE = 847$, and $F_{\text{obs}} = 48.35$

   c. Reject H_0 if $F_{\text{obs}} > 4.31$

   d. Reject H_0. Therefore, we found enough evidence to conclude that the means of distance traveled of these 4 brands of golf balls are not the same.

   e. i. The three samples are independent.
   ii. The samples come from populations with a common (equal) standard deviation.
   iii. The samples come from normal populations.

4. **a.** i. $SS_{xx} = 12710.55$
   ii. $SS_{yy} = 1761.67$
   iii. $SS_{xy} = -3882.37$

   b. $r = -.82$

   c. Yes, because the correlation coefficient indicates a strong negative linear relationship between FCAT-Math score and the percentage below poverty level of the school.

   d. $\hat{y} = 190 - .3x$

   e. 175

   f. About 67.24% of the variability of the FCAT-Math score (y) is explained by the percentage below poverty level of the school (x).

   g. $SE_{\hat{b}} \approx 0.048$, and $t_{\text{obs}} \approx -6.35$

   h. We are 99% confident that b is between -.44 and -.17.