AP* Statistics Test D – Inference – Part VII – Key

1. 1-mean t-test 2. chi-square test for homogeneity

3. 2-prop z-test (note: chi-square is incorrect, as the test is 1-sided!)

4. 1-prop z-test 5. 2-mean t-interval 6. Linear regression t-test for slope

7. Chi-square test for independence

   H_0 : Age and planned Facebook time are independent .

   H_A : Age and planned Facebook time are not independent.

   Sample is random, less than 10% of the population all the expecteds (97.9, 126, 138, 35.7, 46, 50.3, 5.4, 7, 7.6) are bigger than 5.

   $\chi^2 = 22.64$; df = 4; p-value = 0.00015; $\alpha = 0.05$

   With a p-value of 0.00015 < 0.05, we reject Ho. We found statistically significant evidence that age and plans for time on Facebook are not independent.

8a. z = 1.538; P(z > 1.538) = 0.062

8b. $(0.062)^3 = 0.000238$

9a. $\widehat{Wingspan} = -13.0245 + 1.191(Height)$

9b. For every 1 inch taller someone is, we predict his wingspan will be 1.2 inches longer.

9c. The average error in the predictions of the regression equation is about 2.15 inches.

9d. $1.19 \pm 2.074 \cdot 0.126$; We are 95% confident that the slope of the regression equation is between 1.45 wingspan/ht. and 0.93 wingspan/ht.

9e. Yes. r and R^2 are high. The confidence interval on (d) does not contain zero. The p-value for slope is very, very small.

10a. 9/18 = 50% 10b. 6/8 = 75%

10c. Since the overall probability of cheating is 50%, but 75% of the males cheated, it appears that gender and cheating are not independent.

10d. The expected counts are too small. Two of them are 4.

10e. By random selection, we observed 6 or more male cheaters 77 times out of 1000. This shows that we could obtain a result this extreme 7.7% of the time simply by random chance. As this is larger than our usual threshold of 5%, we are inclined to think that perhaps the boys do not cheat more than the girls, but that the differences we observed are due to chance.