**Stat 301 – Quiz 7**

**Please answer the questions below with your partner and submit for Quiz 7 by noon, Thursday.**

**Names:**

**Recall:** A p-value measures the probability of observing a statistic *at least as extreme* as the observed value assuming the null hypothesis is true.

With a two-sided alternative hypothesis, we need to decide which observations we want to consider “more extreme” than the observed result.

Suppose the probability of leaning right when kissing is $π$ = 0.90 and we observe 50 couples.

(a) Use the **One Proportion** [applet](http://www.rossmanchance.com/applets/OneProp/OneProp.htm) to create the hypothesized (null) distribution for this scenario. Include a screen capture, including the mean and standard deviation.

(b) Suppose we observe 42 couples leaning right. Report the Exact Binomial probability P(X > 42).

(c) How far is 42 from the expected value? What value for the number of successes is the same distance *above* the expected value?

(d) Check the **Two-sided**box. What probability does the applet report?

 P(X < 42 or X > )

(e) Discuss another way the applet could be deciding that this outcome is “more extreme” than 42 rather than going the same distance on the other side. [*Hint*: Use the visual or see p. 46.]

(f) Return to the actual study, were Dr. Onur Güntürkün observed 80 couples leaning right in the sample of 124 kissing couples. Find the two-sided p-value for testing H0: $π$ = 0.74. Do you have strong enough evidence to reject the null hypothesis and conclude $π$ differs from 0.74?

(g) Dr. Güntürkün actually conjectured 2/3 as the probability of a kissing couple leaning to the right (consistent with some other right-sided tendencies by humans). Repeat (h) to determine a two-sided p-value for testing this hypothesis. Report the p-value (including a screen capture) and summarize your conclusion about the plausibility that $π$ = 2/3. In other words, would you fail to reject the null hypothesis that $π$ = 2/3?

Of course other values could be believable as well. We will consider values that are not rejected in a test of significance to be *plausible* values of $π$ based on the observed sample proportion.

(h) Use trial-and-error to determine the set of values for $π$ that would not be rejected if used in the null hypothesis, using the two-sided alternative and 0.05 as the level of significance. [*Hints*: Use values of $π$ that are multiples of 0.01 until you can find the boundaries where the exact two-sided p-values change from below 0.05 to above 0.05. Then feel free to “zoom in” to three decimal places of accuracy if you’d like.]

In the table below, enter a 0 if the value is plausible and an X if the value is not plausible.

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| .50 | .51 | .52 | .53 | .54 | .55 | .56 | .57 | .58 | .59 | .60 | .61 | .62 | .63 | .64 | .65 | .66 | .67 | .68 | .69 | .70 | .71 | .72 | .73 | .74 | .75 |