Biol 322 Fall 2012 Homework Assignment 2 15 pts.

This assignment is due Friday Oct 12 by noon. No late submissions will be accepted. Feel free to work through this exercise with your classmates and a textbook in hand but be sure to write up your answers on your own.

We will have a formal lecture on chi square analysis during the first hour of lab on Tuesday Oct 9. All genetics texts cover the chi square statistical test.

The table on pg 2 shows the actual data that Mendel collected in one of his experiments. Each line represents the offspring obtained from selfing a single F1 plant.

1. First perform a formal chi square analysis on the data ***totals***.

2. For plants 6 & 7, analyze the data (separately) using the chi square test. ***Show your work and circle the chi square and p values (which will be similar for the two sets of data)***

3. Your lab partner looks at your calculations and compares the results with the ratios listed in the last column of the table offspring of 6 & 7. He does not understand why the data from the plant with the more skewed ratio has a (very slightly) larger p value and thinks that you have miscalculated. Explain the apparent paradox to him. **1-2 sentences**.

4. Examine the data from plant 4 and read the text next to the table. ***Do you agree with the author's statement?*** You will need to do another chi square here.

NOTE:

- Follow the guidelines for significant figures that are stated in the chi square lecture
- Indicate clearly the expected and observed numbers for each calculation.
- State whether your p-value was taken from a standard table or from a calculator or computer program or web site
- **MOST IMPORTANTLY: your analysis is meaningless if you don't explicitly state what genetical principle(s) underly your expected results.**

from almost 1:1 to over 4:1. This is because gametes combine at random and each parent's offspring represent a small sample. For example, even though only half the gametes available when parent plant 4 self-fertilized contained an *r* allele, there happened to be a run of fertilizations between *r*- and *r*-containing gametes, so the ratio of round to wrinkled phenotypes for this parent is lower than usual. Small samples frequently have skewed results like this, just due to chance. But when Mendel pooled the data into a large sample, it became clear that the overall ratio of round to wrinkled phenotypes was about 3:1 (**Figure 13.7**). If Mendel had been able to obtain a larger number of offspring from parent plant 4, it is very likely that the observed ratio of phenotypes from that parent would have been closer to 3:1.

Rr × *Rr*

Plant Number	Round (*RR* or *Rr*)	Wrinkled (*rr*)	Ratio
1	45	12	3.75:1
2	27	8	3.37:1
3	24	7	3.42:1
4	19	16	1.19:1
5	32	11	2.91:1
6	26	6	4.33:1
7	88	24	3.66:1
8	22	10	2.20:1
9	28	6	4.66:1
10	25	7	3.57:1
Total	**336**	**107**	**3.14:1**