

Name: \_\_\_\_\_

**Quiz 3: Chi-square test**

In pea plants stem length is either long (dominant) or short (recessive). 2 heterozygous long pea plants were crossed. The progeny included 420 pea plants, 308 of which were long and 112 of which were short. Make the relevant hypothesis, calculate the chi square value, and using the chi square tables, conclude whether the hypothesis fits the experiment.

1. Draw the punnet square to show the expected phenotypic ratios. (1pt)

2. Null hypothesis: \_\_\_\_\_.(1pt)

3. The chi square value: \_\_\_\_\_. (1pt) Show your calculations:

4. Degree of freedom: \_\_\_\_\_.(1pt)

5. Does the hypothesis fit the experiment? (yes/no): \_\_\_\_\_. Please circle the corresponding p-value(s). (1pt)

$$\chi^2 = \sum \left[ \frac{(\text{observed} - \text{expected})^2}{\text{number expected}} \right]$$

TABLE 5.1 Critical Chi Square Values							
Degrees of Freedom	p Values						
	Cannot Reject the Null Hypothesis				Null Hypothesis Rejected		
	0.99	0.90	0.50	0.10	0.05	0.01	0.001
	$\chi^2$ calculations						
1	—	0.02	.45	2.71	3.84	6.64	10.83
2	0.02	0.21	1.39	4.61	5.99	9.21	13.82
3	0.11	0.58	2.37	6.25	7.81	11.35	16.27
4	0.30	1.06	3.36	7.78	9.49	13.28	18.47
5	0.55	1.61	4.35	9.24	11.07	15.09	20.52

$\chi^2$  values that lie in the yellow-shaded region of this table allow you to reject the null hypothesis with > 95% confidence, and for recombination experiments, to postulate linkage.