

1. René performed a genetic cross between two homozygous large-leaved plants. She suspects the genes are assorting independently and will follow a 9:3:3:1 ratio. One of them produced large leaves, and gray flowers, and had the genotype *MMNN*, the other had small leaves and produced white flowers, and had the genotype *mmnn*. The F1 was then crossed and produced the following numbers of offspring: 4720 had large leaves and gray flowers, 1410 were large leaved and had white flowers, 1575 were small leaved and had gray flowers, and 620 of them were small leaved and had white flowered. Show the cross (below), and use a chi-square analysis to determine if you support the hypothesis that the genes assort independently, that is they will follow a 9:3:3:1 ratio—be sure to show all work. No work, no credit. (The chi-square probability table is on the back.)

F2 GENOTYPE AFTER CROSSING THE F1 PEA PLANTS.

GAMETES				

- a. Degrees of freedom =
- b. What is your null hypothesis?
- c. For the degrees of freedom, why did you chose the number you chose?
- d. Put your chi-square answer in the box (show your work on the back to receive credit):
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- e. Do you reject or fail to reject the null hypothesis?

TABLE 1. CHI-SQUARE VALUES AND PROBABILITIES.

Chi-Square Values and Probabilities (5% or Less is Considered Significant)							
Degrees of Freedom	p=99%	P=95%	p=80%	p=50%	p=20%	<Fail to Reject< p=5%	>Reject> p=1%
1	0.000157	0.00393	0.0642	0.455	1.642	3.841	6.635
2	0.020	0.103	0.446	1.386	3.219	5.991	9.210
3	0.115	0.352	1.005	2.366	4.642	7.815	11.345
4	0.297	0.711	1.649	3.357	5.989	9.488	13.277
5	0.554	1.145	2.343	4.351	7.289	11.070	15.086
6	0.872	1.635	3.070	5.348	8.558	12.592	16.812
7	1.239	2.167	3.822	6.346	9.803	14.067	18.475
8	1.646	2.733	4.594	7.344	11.030	15.507	20.090
9	2.088	3.325	5.380	8.343	12.242	16.919	21.666
10	2.558	3.940	6.179	9.342	13.442	18.307	23.209