

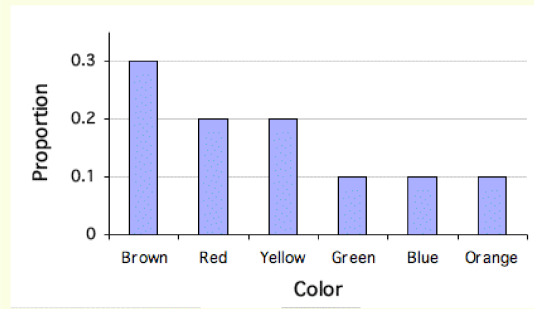
Extra Credit Assignment, due in class Friday, 5-1-09.

NAME :

Signature

Section

Figure 2. Distribution of all M&M's.



1. Examine the contents of a bag of M&M. Fill in the observed and expected counts for a goodness of fit test of the hypothesis that the candy colors in production are those given in Figure 2 above.

Brown    Red    Yellow    Green    Blue    Orange

observed

expected

2. Combine cells as necessary to achieve expected counts of **at least 5 in all cells**. It is ok to fall a little short of 5, say 4.8. Calculate the chi square statistic for the hypothesis that the probabilities of Figure 2 are correct based on this reduced table.

3. Determine the df and P-value.

4. If  $H_0$  is true then the P-value is a random sample from the uniform distribution on  $[0, 1]$ . In class Friday, we will look at P-values from all of the class to see if they are scattered in  $[0, 1]$ .

5. Instead of combining cells, increase your sample by combining data with two other students to meet "expected counts at least 5." Be sure that those in your group do not also combine data with others outside the group.

	Brown	Red	Yellow	Green	Blue	Orange
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	observed					
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	expected					
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6. For the data (5) calculate chi square statistic for goodness of fit, df, P-value.
7. Refer to (5). If  $H_0$  is true then the P-value is a random sample from the uniform distribution on  $[0, 1]$ . In class Friday, we will look at P-values from all of the class to see if they are scattered in  $[0, 1]$ .
8. From **your individual data**, determine a 95% confidence interval for  $p =$  population fraction of M&M that are brown. **Use the CI from page 498, since  $n$  is small.** Does your CI contain the value of  $p$  given in Figure 2?
9. Does **your** CI offer strong evidence against the hypothesis of  $p$  from figure 2?
10. Refer to (8). Give a two-sided z-test of the hypothesis  $p =$  value from Figure 2 **based on the data from your group of 3.** Determine test statistic and P-value. Is there strong evidence against  $p$  from Figure 2?
11. Refer to (8). Collapse **the data of your group of 3** into "brown" and "not brown." Use this collapsed table to give a chi square test of  $H_0: p = 0.3$  from Figure 2. Determine test statistic and P-value. Is there strong evidence against  $p$  from Figure 2? Compare with (10).