

**“Goodness of fit” significance test problem**

For peanut butter M&M’s, the Mars Candy Company reports proportions for each color as given in the following table.

Color	Blue	Brown	Green	Orange	Red	Yellow
Proportion	0.20	0.10	0.20	0.20	0.10	0.20

Based on this we can form the following hypotheses:

$H_0$  : The proportions are as listed above.

$H_a$  : The proportions are not as listed above.

To carry out a significance test on these hypotheses, we get a sample of peanut butter M&M’s and measure the color for each one in the sample. Counts from such a sample (as measured by Professor James Bernhard) are given in the following table.

Color	Blue	Brown	Green	Orange	Red	Yellow
Observed count	28	42	34	24	21	52
Expected count						
Contribution to $\chi^2$						

- Compute the expected counts and record these in the table above.
- Compute the contributions to  $\chi^2$  and record these in the table above.
- Compute the total value for the  $\chi^2$ -statistic.
- Determine the  $P$ -value for your  $\chi^2$ -statistic value from (c).
- Use your  $P$ -value from (d) to assess the evidence from this sample against  $H_0$ .
- Write a conclusion in real-world terms.