MA 110 Probability and Independent Events
Sections 7-2, 7-3

Please <u>don't</u> eat your M&M's yet. First, your group needs to use them to determine the number of M&M's in each category for the following chart:

	Blue	**Brown**	**Green**	**Orange**	**Red**	**Yellow**	**Total**
Peanut							
Milk chocolate							
Total							

Once you have filled out the chart, you can eat your candy if you like.

I. Suppose that an M&M is selected at random from all the M&M's given out (before any were eaten). Find the (empirical) probability that

1. it is a milk chocolate M&M	5. it is red given that it is a milk chocolate M&M
2. it is red	6. it is a milk chocolate M&M given that it is red
3. it is not red	7. it is blue given that it is a peanut M&M
4. it is a red milk chocolate M&M	8. it is a peanut M&M given that it is blue

II. Suppose you want to know if you are more or less likely to choose a yellow M&M if you select the M&M from all of the M&Ms or just from the peanut M&Ms. To answer this question, you need to determine if the events "selecting a yellow M&M" and "selecting a peanut M&M' are independent or not.

Two events are said to be ***independent*** if the occurrence of one does not affect the occurrence of the other. Mathematically, events A and B are independent if and only if

$$P(A) = P(A|B) \text{ or if } P(B) = P(B|A)$$

Let Y = "a yellow was selected" and P = "a peanut M&M was selected".

1. Find $P(Y)$ and $P(Y|P)$

2. Are the events "a yellow M&M was selected" and "a peanut M&M was selected" independent or not? How do you know?

3. Another way to test for independence of events A and B is to use the following: Events A and B are independent if and only if $P(A \cap B) = P(A) \cdot P(B)$. Apply this test for independence to events Y and P above.