QUIZ 7 -SOLUTION

A bag of Plain M&M's from Halloween contained 59 M&M's with 4 red, 11 green, 7 orange, 14 yellow, 9 blue and 14 brown. From the M&M's homepage, 30% of candies are brown, 20% yellow, 20% red, 10% green, 10% blue and 10% orange (M&M's home page, *http://www.m-ms.com/factory/history/faq1.html*).

a) (2 points) What is the expected proportion of red M&M's in the bag?
This is the population proportion or 0.20.

b) (2 points) What is the standard deviation of the proportion of red M&M's for bags of this size?

$$\sqrt{\left(\frac{.20 * .80}{59}\right)}$$

As the population proportion is known use the population value rather than the sample proportion.

c) (6 points) What percentage of bags contain 4 or fewer red candies? Is this bag unusual? State and justify any rules/conditions that you need to answer this.

The probability of 4 or fewer red candies is the same as the probability of getting a sample proportion of 4/59 or less.

Using the rule for sample proportions, we know that the sample proportions are normally distributed with a mean of 0.2 and a standard deviation of $\sqrt{.2 * .8/59}$.

Hint: now draw a picture.

This standardized score for 4/59 is

$$Z = \frac{4/59 - .20}{\sqrt{\left(\frac{.20 * .80}{59}\right)}} = -2.54$$

The corresponding probability of getting 4 or fewer red MM's is then 0.006.