Answer on Question #43165-Math-Statistics and Probability

In a package of M&Ms there are 20 pieces. The pieces come in 6 different colors: red, blue, green, yellow, orange and brown. Assuming that the M&M colors occur with equal probability, what is the probability of getting 5 green M&Ms in a package, using binomial distribution?

Solution

In a package of M&Ms there are n = 20 pieces.

Assuming that the M&M colors occur with equal probability, the probability of getting green M&Ms in a package is $p = \frac{1}{6}$.

The probability of getting 5 green M&Ms in a package is

$$\Pr(X=5) = {\binom{20}{5}} \left(\frac{1}{6}\right)^5 \left(1 - \frac{1}{6}\right)^{20-5},$$

where

$$\binom{20}{5} = \frac{20!}{(20-5)!\,5!} = 15504.$$
$$\Pr(X=5) = 15504 \left(\frac{1}{6}\right)^5 \left(\frac{5}{6}\right)^{15} = 0.13.$$

Answer: 0. 13.