Math 150

Section 9.4 Binomial Probability

Bernoulli (or Binomial) Experiment - An experiment consisting of **independent** repeated trials with each trial resulting in either a success or a failure. The probability of success for each trial is constant.

The formula for calculating the probability of obtaining exactly x successes in n trials is

$$P(x) = (nCx)(p^x)((1-p)^{n-x})$$

where

x is the number of successes

n is the number of trials

p is the probability of a trial resulting in a success

$1-p$ is the probability of a trial resulting in a failure.

Examples of Bernoulli Experiments include rolling a die several times, flipping one or more coins, and selecting cards from a deck **with replacement**.

Example 1 A die is rolled four times. What is the probability of rolling exactly three 5's in the four rolls?

Example 2 A coin is tossed 5 times. Find the probability of getting

(a) exactly 3 heads

(b) at least 3 heads

Example 3 A certain genetic test gives correct results 85% of the time. If 8 people are tested, what is the probability that exactly 2 people will be given the correct result? Find the probability that no more than 2 people will be given the correct result.

Example 4 A multiple choice test has ten questions. Each question has five answer choices. If a student guesses on all ten questions, what is the probability the student will guess correctly:

(a) exactly 4 times?

(b) at least 9 times?