Binomial Probability Distribution-

Experiments consist of repeated independent trails, each trails having only two possible complementary outcomes.

For Example:-

The two possible outcomes of a trail may be head & tail, success & failure, right & wrong, good & defective.

- If the probability of each outcome remains the same throughout the trails then such trails are called the 'Bernoulli trails" & the experiment having n Bernoulli trails is called binomial experiment. In other words, an experiment is called a binomial prob. experiment if it possesses the following four properties:

(i) The outcomes of each trails may be classified into one of two categories, called success (S) & Failure (F). The outcome of interest is called a success & the otherone is failure.

(ii) The prob. of success, denoted by P, remains constant for all trails.

(iii) The succesive trails are all independent.

(iv) The experiment is repeated a fixed number of times, say n.

Prob. Mass Function :- (Pmf)

$$f(x) = P(X=x) = {}^{n}C_x \, p^x \, q^{n-x}$$

Range :-

$$x = 0, 1, 2, \ldots, n$$

where

p = prob. of success

q = prob. of failure

$q = 1-p$

$p+q = 1$

$$\boxed{q = 1-p}$$

- The binomial prob. distribution has two parameters n & p

Mean & Variance :-

Mean = np

Variance = npq