Geometric Distribution

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Geometric Distribution

When an experiment consists of random trials with probability p of success and the trials are repeated until the first success occur, it is called a geometric experiment. A geometric random variable represents how long one has to wait for a success. It also called the waiting time random variable.

Geometric Distribution

Geometric Distribution has the following Properties:

- There are only two possible outcomes of each trial. The outcomes can be classified as a success (S) or as a failure (F).

- The experiment is repeated a variable number of times until the first success is obtained.

- The successive trial are all independent.

- The probability of a success, denoted by p, is the constant for all the trials.

Geometric Distribution

The geometric Distribution has the following formula

$$P(X = x) = q^{x-1}p, \qquad x = 1,2,3....\infty$$

Geometric Distribution has one parameter p.

$Mean = \mu = \dfrac{1}{p}$

$Variance = \sigma^2 = \dfrac{q}{p^2}$

$Standard\ Deviation = \sqrt{\dfrac{q}{p^2}}$

Question 1

A company receives 5% of its orders over the internet, within a certain period of time.

a) What is the probability that the fifth order received is the first internet order?

b) Find the average.

Question 2

A manufacturer uses electrical fuses in an electronic system. The fuses are purchased in large lots and tested sequentially until the first defective is observed. Assume that the lot contains 1% defective fuses.

a) What is the probability that the first defective fuse will be one of the first five fuses tested?

b) What is the probability that the first defective fuse will be fifth one?