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Discuss the Application of Binomial Theorem by Mathqa22

Article published on July 30th 2012 | Education

Introduction to Binomial distribution:

The Binomial distribution is a discrete probability distribution. Binomial distribution is also known as the "Bernoulli distribution" after the Swiss mathematician James Bernoulli (1654-1705) who discovered it in 1700 and was published in 1713.

Assumptions of Binomial distribution:

N, the number of trails is finite.

There are only two possible outcomes in each trial arbitrarily called success and failure.

The probability of success in each trail is p and is constant for each trail. q=1-p is then termed as the probability of failure and is constant for each trail.

All the "n" trails are independent.

The trails satisfying these assumptions are called Bernoulli trails.

Probability of Binomial Distribution:

Let us find the probability of getting "x" success in "n" trails, where the probability of getting success is "p", the probability of getting failure is "q". Let us denote success by "s" and failure by â€œf ". Therefore the probability of x success and consequently n-x failures in the sequence of n trails.Â Â Â Â Â Â Â Â Â Â Â Â Â

p(sfssfss............fs)Â Â Â Â

where "s" occurs "x" times

f occurs "n-x" times p(sfssfsf...............f) = p(s).p(f).p(s).p(s)..............p(f) = p.q.p.p..............q = px qn-x

But in "n" trails the total number of possible ways of getting "x" success inÂ Â nCxÂ Â Â Â Â Â Â Â Â Â Â
Â Â Â Â Â Â Â

By additive law of probabilityÂ

p(X=x) =Â nCxÂ Â pxÂ Â qn-xÂ Â

where x = 0,1,2,...............nÂ Â
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The probability distribution is called the Binomial distribution.

Total probability:

Total probability =Â `sum_(x=0)^n`Â nCxÂ pxÂ qn-x

Â Â Â Â Â Â Â Â Â Â Â Â Â Â Â Â Â =Â nC1Â p0Â qnÂ +Â nC1Â p1Â qn-1Â + ...+Â nCnÂ pnÂ

Â Â Â Â Â Â Â Â Â Â Â Â Â Â Â Â Â = (q + p)n

Â Â Â Â Â Â Â Â Â = (1)nÂ Â Â

Â Â Â Â Â Â Â Â Â = 1Â Â Â Â Â Â Â Â

Mean of Binomial Distribution:

Let us find the probability of getting "x" success in "n" trails, where the probability of getting success is "p", the probability of getting failure is "q". Let us denote success by "s" and failure by " f ". Therefore the probability of x success and consequently n-x failures in the sequence of n trails.Â Â Â Â Â Â Â Â Â Â Â Â Â

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Â Â Â Â Â Â Â Â Â = (1)nÂ Â Â

Â Â Â Â Â Â Â Â Â = 1Â Â Â Â Â Â Â Â

Variance of Binomial Distribution:

Let us find the probability of getting "x" success in "n" trails, where the probability of getting success is "p", the probability of getting failure is "q". Let us denote success by "s" and failure by " f ". Therefore the probability of x success and consequently n-x failures in the sequence of n trails.Â Â Â Â Â Â Â Â Â Â Â Â Â

p(sfssfss.............fs)Â Â Â Â

where "s" occurs "x" times

f " occurs "n-x" times

p(sfssfsf................f) = p(s).p(f).p(s).p(s).............. p(f)Â = p.q.p.p..............qÂ Â Â = pxÂ qn-xÂ Â Â Â Â

But in "n" trails the total number of possible ways of getting "x" success inÂ Â nCxÂ

By additive law of probabilityÂ

p(X=x) =Â nCxÂ Â pxÂ Â qn-xÂ Â

where x = 0,1,2,................nÂ Â Â Â

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Total probability =Â `sum_(x=0)^n`Â nCxÂ pxÂ qn-x

Â Â Â Â Â Â Â Â Â Â Â Â Â Â Â Â Â Â =Â nC1Â p0Â qnÂ +Â nC1Â p1Â qn-1Â + ...+Â nCnÂ p

Â = (q + p)n

Â Â Â Â Â Â Â Â Â Â ÂÂ = (1)nÂ Â Â

Â Â Â Â Â Â Â Â Â Â ÂÂ = 1

Mathqa22 - About Author:
Know more about the a how to multiply 3 fractions,Online tutoring,a how to divide and multiply fractions.Online tutoring will help us to learn and do our homework very easily without going here and there.

Article Keywords:
Application of Binomial Theorem, Binomial Theorem Examples