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## Contents

Expression of binomial theorem . . . . .	2
Condition for application of binomial theorem . . . . .	2
Proof for expression of binomial theorem in terms of induction . . . . .	2
Number of terms in the binomial expansion of index $n$ . . . . .	2
Sum of exponent in each term in binomial expansion . . . . .	2
First term in expansion of $(a + x)$ raised to $n$ in binomial expansion . . . . .	2
Last term in expansion of $(a + x)$ raised to $n$ in binomial expansion . . . . .	2
Term decreasing by 1 on tending to last terms in binomial expansion . . . . .	3
Term increasing by 1 on tending to last terms in binomial expansion . . . . .	3
Relation of terms equidistant from beginning and end . . . . .	3

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## Expression of binomial theorem

$$(a + x)^n = C(n, 0)a^n + C(n, 1)a^{n-1}x + C(n, 2)a^{n-2}x^2 + \dots + C(n, r)a^{n-r}x^r + \dots + C(n, n)x^n$$

## Condition for application of binomial theorem

Positive integer

## Proof for expression of binomial theorem in terms of induction

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$$(a + x)^n = (a + x)(a + x) \dots \text{to } n \text{ factors}$$

- Take a from n factors each.
- Take a from n - 1 factors each. Take x from remaining one.
- Take a from n - r factors each. Take x from r factors.
- Vary r from 0 to n.
- Express by C(n,r)

## Number of terms in the binomial expansion of index n

$$n + 1$$

## Sum of exponent in each term in binomial expansion

$$n$$

## First term in expansion of ( a + x ) raised to n in binomial expansion

$$a^n$$

## Last term in expansion of ( a + x ) raised to n in binomial expansion

$$x^n$$

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**Term decreasing by 1 on tending to last terms in binomial expansion**

a

**Term increasing by 1 on tending to last terms in binomial expansion**

x

**Relation of terms equidistant from beginning and end**

Equal