# Binomial Theorem - Class XI

## Related Questions with Solutions

## Questions

### Quetion: 01

If $(1 + x)^n = C_0 + C_1x + C_2x^2 + ... + C_nx^n$, then $C_0C_1 + C_1C_2 + C_2C_3 + ... + C_{n-1}C_n$ is equal to-

A. $\frac{2n!}{n!n!}$

B. $\frac{2n!}{n!(n+1)!}$

C. $\frac{2n!}{(n-1)!(n+1)!}$

D. $\frac{2n!}{(n-1)!n!}$

## Solutions

### Solution: 01

$[1 + x]^n = {}^nC_0 + {}^nC_1x + {}^nC_2x^2 + ... + {}^nC_nx^n$

$[x + 1]^n = {}^nC_0x^n + {}^nC_1x^{n-1} + ... + {}^nC_0$

multiply $[1 + x]^{2n} = [{}^nC_0 + {}^nC_1x + ... + {}^nC_nx^n]\,[{}^nC_0x^n + ... + {}^nC_0]$

${}^nC_0\,{}^nC_1 + {}^nC_1\,{}^nC_2 + ... + {}^nC_{n-1}\,{}^nC_n$ = coefficient of $x^{n-1}$ in $[1 + x]^{2n}$

$$= {}^{2n}C_{n-1} = \frac{2n!}{(n-1)!(n+1)!}$$

## Correct Options

Answer:01

Correct Options: C