## Binomial Theorem - Class XI

## Related Questions with Solutions

### Questions

**Quetion: 01**

Let a, b, c, d are the coefficients of any four consecutive terms in the expansion of $(1+x)^n, n \in N$, then $\frac{a}{a+b}+\frac{c}{c+d}=$

A. $\frac{2b}{b-c}$
B. $\frac{2b}{b^2+c^2}$
C. $\frac{2b}{b+c}$
D. none of these

### Solutions

**Solution: 01**

Let a, b, c, d are ${}^nC_r$, ${}^nC_{r+1}$, ${}^nC_{r+2}$, ${}^nC_{r+3}$

$$\frac{{}^nC_r}{{}^nC_r+{}^nC_{r+1}}+\frac{{}^nC_{r+2}}{{}^nC_{r+2}+{}^nC_{r+3}}$$

$$=\frac{{}^nC_r}{{}^{n+1}C_{r+1}}+\frac{{}^nC_{r+2}}{{}^{n+1}C_{r+3}}$$

$$=\frac{n!(r+1)!(n-r)!}{r!(n-r)!(n+1)!}+\frac{n!(r+3)!(n-r-2)}{(r+2)!(n-r-2)!(n+1)!}$$

$$=\frac{(r+1)}{n+1}+\frac{r+3}{n+1}=\frac{2r+4}{n+1}$$

Now, $\frac{2b}{b+c}=2\left[\frac{{}^nC_{r+1}}{{}^nC_{r+1}+{}^nC_{r+2}}\right]=2\left[\frac{{}^nC_{r+1}}{{}^{n+1}C_{r+2}}\right]$

$$=2\left[\frac{n!(r+2)!(n-r-1)!}{(r+1)!(n-r-1)!(n+1)!}\right]$$

$$=2\left[\frac{r+2}{n+1}\right]$$

### Correct Options

Answer:01
Correct Options: C