

Binomial Theorem - Class XI

Past Year JEE Questions

Questions

Question: 01

The coefficient of the middle term in the binomial expansion in powers of x of $(1 + \alpha x)^4$ and $(1 - \alpha x)^6$ is the same if α equals

- A. $\frac{3}{5}$
- B. $\frac{10}{3}$
- C. $-\frac{5}{10}$
- D. $-\frac{5}{3}$

Solutions

Solution: 01

Explanation

For $(1 + \alpha x)^4$ the middle term $T_{\frac{4}{2}+1} = {}^4C_2 \cdot \alpha^2 x^2$

\therefore Coefficient of middle term $= {}^4C_2 \cdot \alpha^2$

For $(1 - \alpha x)^6$ the middle term $T_{\frac{6}{2}+1} = {}^6C_3 \cdot -\alpha^3 x^3$

\therefore Coefficient of middle term $= {}^6C_3 \cdot -\alpha^3$

\therefore According to question,

$${}^4C_2 \cdot \alpha^2 = {}^6C_3 \cdot -\alpha^3$$

$$\Rightarrow 6 = 20 \times -\alpha$$

$$\Rightarrow \alpha = -\frac{3}{10}$$