



Binomial Theorem Ex 18.2 Q6

Term from the beginning

$$T_N = T_{r+1} = {}^nC_r x^{n-r} y^r \quad \text{---(i)}$$

$$N = 4, r = 3, n = 9, x = x, y = \frac{2}{x}$$

$$T_4 = T_{3+1} = {}^9C_3 x^6 \left(\frac{2}{x}\right)^3 = \frac{9 \times 7 \times 8}{3 \times 2} x^3 \times 8 = 672x^3$$

4th term from the end = 7th term from beginning

Using (i)

$$N = 7, r = 6, n = 9, x = x, y = \frac{2}{x}$$

$$T_7 = T_{6+1} = {}^9C_6 x^3 \left(\frac{2}{x}\right)^6 = \frac{9 \times 8 \times 7}{3 \times 2} x \frac{2^6}{x^3} = \frac{5376}{x^3}$$

Binomial Theorem Ex 18.2 Q7

$$T_N = T_{r+1} = (-1)^r {}^nC_r x^{n-r} y^r$$

4th term from the end = 7th term from beginning

$$N = 7, r = 6, n = 9, x = \frac{4x}{5}, y = \frac{5}{2x}$$

$$T_7 = T_{6+1} = (-1)^6 {}^9C_6 \left(\frac{4x}{5}\right)^3 \left(\frac{5}{2x}\right)^6 = \frac{9 \times 8 \times 7}{3 \times 2} x \frac{4^3 \times 5^6}{5^3 \times 2^6} \times \frac{x^3}{x^6} = \frac{9 \times 8 \times 7 \times 5^3}{6 \times x^3} = \frac{9 \times 8 \times 7 \times 125}{6 \times x^3} = \frac{10500}{x^3}$$

Binomial Theorem Ex 18.2 Q8

7th term from the end = 3rd term from beginning

$$T_N = T_{r+1} = (-1)^r {}^nC_r x^{n-r} y^r$$

$$N = 3, r = 2, n = 8, x = 2x^2, y = \frac{3}{2x}$$

$$T_3 = T_{2+1} = (-1)^2 {}^8C_2 (2x^2)^6 \left(\frac{3}{2x}\right)^2 = \frac{8 \times 7}{2} x \frac{2^6 \times 3^2 \times x^{12}}{2^2 \times x^2} = 8 \times 7 \times 9 \times 8 \times x^{10} = 4032x^{10}$$

Binomial Theorem Ex 18.2 Q9(i)

$$x^{10} \text{ in } \left(2x^2 - \frac{1}{x}\right)^{20}$$

$$T_n = T_{r+1} = (-1)^r {}^nC_r x^{n-r} y^r$$

$$(-1)^r {}^{20}C_r (2x^2)^{20-r} \left(\frac{1}{x}\right)^r$$

Coefficient of x^{10} is

$$(-1)^r {}^{20}C_r 2^{20-r} x^{40-2r} x^{-r} \quad \text{---(i)}$$

$$\Rightarrow x^{40-3r} = x^{10}$$

$$\Rightarrow 10 - 3r = 10$$

$$3r = 30$$

$$r = 10$$

Substituting $r = 10$ in (i)

$$= (-1)^{10} {}^{20}C_{10} 2^{10}$$

Binomial Theorem Ex 18.2 Q9(ii)

$$x^7 \text{ in } \left(x - \frac{1}{x^2}\right)^{40}$$

$$T_n = T_{r+1} = (-1)^r {}^nC_r x^{n-r} y^r$$

$$= (-1)^r {}^{40}C_r x^{40-r} \left(\frac{1}{x^2}\right)^r$$

$$= (-1)^r {}^{40}C_r x^{40-r-2r}$$

$$\Rightarrow x^7 = x^{40-3r}$$

$$7 = 40 - 3r$$

$$3r = 33$$

$$r = 11$$

$$= (-1)^{11} {}^{40}C_{11} \text{ is coeff of } x^7$$

$$= -{}^{40}C_{11}$$

***** END *****