



Binomial Theorem Ex 18.2 Q15(vi)

$$\left(3 - \frac{x^3}{6}\right)^7$$

Here  $n=7$ , which is odd

$\therefore$  middle term is  $\binom{7+1}{2}$  and  $\binom{7+1}{2}+1 = 4^{th}, 5^{th}$  terms

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

$$T_4 = T_{4+1} = (-1)^3 {}^7C_3 (3)^{7-3} \left(\frac{x^3}{6}\right)^3$$

$$= -\frac{7!}{3!4!} \times 3^4 \times \frac{x^9}{6^3}$$

$$= -\frac{7 \times 6 \times 5}{3 \times 2 \times 1} \times 81 \times \frac{x^9}{216}$$

$$= -\frac{105}{8} x^9$$

And

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

$$T_5 = T_{4+1} = (-1)^4 {}^7C_4 (3)^{7-4} \left(\frac{x^3}{6}\right)^4$$

$$= \frac{7!}{4!3!} \times 3^3 \times \frac{x^{12}}{6^4}$$

$$= \frac{7 \times 6 \times 5}{3 \times 2 \times 1} \times 27 \times \frac{x^{12}}{1296}$$

$$= \frac{35}{48} x^{12}$$

Binomial Theorem Ex 18.2 Q15(vii)

$$\left(\frac{x}{3} + 9y\right)^{10}$$

Here  $n=10$ , which is even, therefore it has 11 terms

$\therefore$  middle term is  $\binom{n}{2}+1 = 6^{th}$  term

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

$$T_6 = T_{5+1} = (-1)^5 {}^{10}C_5 \left(\frac{x}{3}\right)^{10-5} (9y)^5$$

$$= -\frac{10!}{5!5!} \times \frac{x^5}{3^5} \times 9^5 \times y^5$$

$$= 61236 x^5 y^5$$

Binomial Theorem Ex 18.2 Q15(viii)

For the given binomial expansion  $n = 12$ .

So middle term is  $\left(\frac{12}{2} + 1\right) = 7^{\text{th}}$  term.

$$T_7 = {}^{12}C_6 (2ax)^{12-6} \left(-\frac{b}{x^2}\right)^6$$

$$T_7 = {}^{12}C_6 (2ax)^6 \left(\frac{b}{x^2}\right)^6$$

$$T_7 = {}^{12}C_6 (2^6 a^6 x^6) \left(\frac{b^6}{x^{12}}\right)$$

$$T_7 = {}^{12}C_6 \left(\frac{2^6 a^6 b^6}{x^6}\right)$$

$$\text{Middle term is } {}^{12}C_6 \left(\frac{2^6 a^6 b^6}{x^6}\right).$$

Binomial Theorem Ex 18.2 Q15(ix)

For the given binomial expansion  $n = 9$ .

So middle terms are  $\left(\frac{9+1}{2}\right) = 5^{\text{th}}$  term and  $\left(\frac{9+3}{2}\right) = 6^{\text{th}}$  term.

$$T_5 = {}^9C_4 \left(\frac{p}{x}\right)^{9-4} \left(\frac{x}{p}\right)^4$$

$$T_5 = {}^9C_4 \left(\frac{p}{x}\right)^5 \left(\frac{x}{p}\right)^4$$

$$T_5 = {}^9C_4 \left(\frac{p}{x}\right)$$

$$T_6 = {}^9C_5 \left(\frac{p}{x}\right)^{9-5} \left(\frac{x}{p}\right)^5$$

$$T_6 = {}^9C_5 \left(\frac{p}{x}\right)^4 \left(\frac{x}{p}\right)^5$$

$$T_6 = {}^9C_5 \left(\frac{x}{p}\right)$$

The middle terms are  ${}^9C_4 \left(\frac{p}{x}\right)$  and  ${}^9C_5 \left(\frac{x}{p}\right)$ .

Binomial Theorem Ex 18.2 Q15(x)

For the given binomial expansion  $n = 10$ .

So middle term is  $\left(\frac{10}{2} + 1\right) = 6^{\text{th}}$  term.

$$T_6 = {}^{10}C_5 \left(\frac{x}{a}\right)^{10-5} \left(-\frac{a}{x}\right)^5$$

$$T_6 = - {}^{10}C_5 \left(\frac{x}{a}\right)^5 \left(\frac{a}{x}\right)^5$$

$$T_6 = - {}^{10}C_5 = -252$$

Middle term is  $-252$ .

\*\*\*\*\* END \*\*\*\*\*

