Binomial Theorem Ex 18.2 Q1

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

$$T_{11} = T_{10+1} = (-1)^{10}\, {}^{25}C_{10} (2x)^{15} \left(\frac{1}{x^2}\right)^{10} = {}^{25}C_{10} \left(\frac{2^{15}}{x^5}\right) = \frac{25!}{10!5!} 2^{15} x^{15} \times x^{-20}$$

11^{th} term from the end $= (26 - 11 + 1) = 16^{th}$ from beginning.

$$\Rightarrow \quad T_{16} = T_{15+1} = (-1)^{15}\, {}^{25}C_{15} (2x)^{10} \left(\frac{1}{x^2}\right)^{15} = -{}^{25}C_{15} \frac{2^{10}}{x^{20}}$$

Binomial Theorem Ex 18.2 Q2

$$T_n = T_{r+1} = (-1)^r x^{n-r} y^r \times {}^{10}C_r$$

$$n = 7,\ r = 6,\ x = 3x^2,\ y = \frac{1}{x^3}$$

$$T_7 = T_{6+1} = (-1)^6\, {}^{10}C_6 \left(3x^2\right)^4 \left(\frac{1}{x^3}\right)^6 = {}^{10}C_6 3^4 x^8 \times \frac{1}{x^{18}} = {}^{10}C_6 \times \frac{81}{x^{10}} = \frac{210 \times 81}{x^{10}} = \frac{17010}{x^{10}}$$

Binomial Theorem Ex 18.2 Q3

Fifth term from the end is

$(11 - 5 + 1) = 7^{th}$ term from beginning

$$T_7 = T_{6+1} = (-1)^r\, {}^nC_2 x^{n-r} y^r$$

$$= (-1)^6\, {}^{10}C_6 (3x)^4 \left(\frac{1}{x^2}\right)^6 = {}^{10}C_6 \times 3^4 \times \frac{x^4}{x^{12}} = \frac{210 \times 81}{x^8} = \frac{17010}{x^8}$$

Binomial Theorem Ex 18.2 Q4

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

$$N = 8,\ r = 7,\ x = x^{3/2} y^{1/2},\ y = x^{1/2} y^{3/2},\ n = 10$$

$$T_8 = T_{7+1} = (-1)^7\, {}^{10}C_7 \left(x^{3/2} y^{1/2}\right)^3 \left(x^{1/2} y^{3/2}\right)^7 = -{}^{10}C_7 x^{9/2} \times x^{7/2} \times y^{3/2} y^{21/2} = -120 x^8 y^{12}$$

Binomial Theorem Ex 18.2 Q5

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

$$N = 7,\ r = 6,\ n = 8,\ x = \frac{4x}{5},\ y = \frac{5}{2x}$$

$$T_7 = T_{6+1} = {}^8C_6 \left(\frac{4x}{5}\right)^2 \left(\frac{5}{2x}\right)^6 = 28 \times \frac{4^2}{5^2} \times x^4 \times \frac{5^6}{2^6 \times x^6} = \frac{28}{4} \times \frac{5^4}{x^4} = \frac{7 \times 5 \times 125}{x^4} = \frac{4375}{x^4}$$

*********** END **********