

1.) Simplify: $x^5 + 10x^4a + 40x^3a^2 + 80x^2a^3 + 80xa^4 + 32a^5$.

solution: We have,

$$\begin{aligned} & x^5 + 10x^4a + 40x^3a^2 + 80x^2a^3 + 80xa^4 + 32a^5 \\ &= x^5 + 5 \cdot x^4(2a) + 10x^3(2a)^2 + 10x^2(2a)^3 + 5x(2a)^4 + (2a)^5 \\ &= {}^5C_0 x^5 + 5C_1 x^4(2a) + 5C_2 x^3(2a)^2 + 5C_3 x^2(2a)^3 + 5C_4 x(2a)^4 + 5C_5 (2a)^5 \\ &= (x+2a)^5 \end{aligned}$$