

To find a specific term in a binomial expansion of the form  $(a + b)^n$

**Method: Combinatorics (Counting Theory) and Polynomial Coefficient Mapping.**

Instead of writing out the variables, focus exclusively on isolating the numbers. The shortcut pattern for extracting any term's numeric coefficient is:

$$\text{Numeric Coefficient} = (nC_r) \cdot (\text{coefficient of } a)^{n-r} \cdot (\text{coefficient of } b)^r$$

For  $(x - 3y)^7$  seeking the  $y^3$  term:

1. Identify  $r$  from the target power ( $r = 3$ ).
2. Identify the coefficient of  $a$  (it is 1, since it's just  $x$ ).
3. Identify the coefficient of  $b$  (it is  $-3$ ).
4. Compute immediately:

$$\text{Coefficient} = (7C_3) \cdot (1)^4 \cdot (-3)^3$$

$$\text{Coefficient} = -945$$