

Question: In the binomial expansion of $(a + b)^n$, the coefficient of x^k is $\binom{n}{k} a^{n-k} b^k$. The sum of the coefficients of x^k is $(a + b)^n$. The sum of the coefficients of x^k is $(a + b)^n$.

Term	1	2	3	4		
$(a + b)^2$	a^2	$2ab$	b^2			
$(a + b)^3$	a^3	$3a^2b$	$3ab^2$	b^3		
$(a + b)^4$	a^4	$4a^3b$	$6a^2b^2$	$4ab^3$	b^4	
$(a + b)^5$	a^5	$5a^4b$	$10a^3b^2$	$10a^2b^3$	$5ab^4$	b^5

Forced: every 1st repeating term
 The coefficient of x^k is $\binom{n}{k} a^{n-k} b^k$
 $(a + b)^n = \sum_{k=0}^n \binom{n}{k} a^{n-k} b^k$
 $(a + b)^{n+1} = \sum_{k=0}^{n+1} \binom{n+1}{k} a^{n+1-k} b^k$

Let $x = a + b$
 $x^2 = (a + b)^2 = a^2 + 2ab + b^2$
 $x^3 = (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$
 $x^4 = (a + b)^4 = a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$
 $x^5 = (a + b)^5 = a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5$
 $x^6 = (a + b)^6 = a^6 + 6a^5b + 15a^4b^2 + 20a^3b^3 + 15a^2b^4 + 6ab^5 + b^6$
 $x^7 = (a + b)^7 = a^7 + 7a^6b + 21a^5b^2 + 35a^4b^3 + 35a^3b^4 + 21a^2b^5 + 7ab^6 + b^7$
 $x^8 = (a + b)^8 = a^8 + 8a^7b + 28a^6b^2 + 56a^5b^3 + 70a^4b^4 + 56a^3b^5 + 28a^2b^6 + 8ab^7 + b^8$
 $x^9 = (a + b)^9 = a^9 + 9a^8b + 36a^7b^2 + 84a^6b^3 + 126a^5b^4 + 126a^4b^5 + 84a^3b^6 + 36a^2b^7 + 9ab^8 + b^9$
 $x^{10} = (a + b)^{10} = a^{10} + 10a^9b + 45a^8b^2 + 120a^7b^3 + 210a^6b^4 + 252a^5b^5 + 210a^4b^6 + 120a^3b^7 + 45a^2b^8 + 10ab^9 + b^{10}$