1. $(x+y)^n = x^n + nx^{n-1}y + \dfrac{n(n-1)}{2!}x^{n-2}y^2 + \ldots\ldots + \dfrac{n!}{k!(n-k)!}x^{n-k}y^k + \ldots\ldots + nxy^{n-1} + y^n$

$$= \sum_{k=0}^{n} \frac{n!}{k!(n-k)!}x^{n-k}y^k$$

$$= \sum_{k=0}^{n} C_k^n x^{n-k}y^k$$

2. $(x-y)^n = \displaystyle\sum_{k=0}^{n} \frac{n!}{k!(n-k)!}x^{n-k}(-y)^k$

$$= \sum_{k=0}^{n} \frac{n!}{k!(n-k)!}(-1)^k x^{n-k}y^k$$

$$= \sum_{k=0}^{n} C_k^n (-1)^k x^{n-k}y^k$$

3. $x^n - y^n = (x-y)(x^{n-1} + x^{n-2}y + x^{n-3}y^2 + \ldots\ldots + xy^{n-2} + y^{n-1})$

4. $x^n + y^n = (x+y)(x^{n-1} - x^{n-2}y + x^{n-3}y^2 - \ldots\ldots - xy^{n-2} + y^{n-1})$，$n$ 為奇數

5. $x^n + y^n = (x+y)(x^{n-1} - x^{n-2}y + x^{n-3}y^2 - \ldots\ldots + xy^{n-2} - y^{n-1})$，$n$ 為偶數

6. $(x_1 + x_2 + x_3 + \ldots + x_n)^2 = (x_1^2 + x_2^2 + x_3^2 + \ldots + x_n^2) + 2(兩兩乘積和)$

練習 1：試展開 $(x+1)^6$

練習 2：試展開 $(x-1)^7$

練習 1：試求 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29 等數的兩兩乘積和