O Level A Maths Tutorial 5: Binomial Expansions

Syllabus :
• Use of the Binomial Theorem for positive integer n

---

1. (a) Expand $(x+y)^2$.

   (b) Expand $(x+y)^3$.

   (c) Use Pascal's triangle to write down the expansion for $(x+y)^4$ directly.

• Use of the notations n! and $\binom{n}{r}$

---

2. Given $n! = n(n-1)(n-2) \ldots 3.2.1$,
    and $0! = 1$.

    Find the values of 1! , 2! , 3! and 4! .

3. Given

$$\binom{n}{r} = \frac{n!}{r!\,(n-r)!} = \frac{n(n-1) \ldots (n-r+1)}{1 \cdot 2 \cdot 3 \ldots r}$$

Find the values of

$$\binom{3}{0}, \binom{3}{1}, \binom{3}{2} \text{ and } \binom{3}{3}.$$

• Use of the general term $\binom{n}{r} a^{n-r} b^r$, $0 \le r \le n$

(knowledge of the greatest term and properties of the coefficients is not required)

---

3. Using the formula of the general term, calculate the coefficients for the expansion of each of the following:

(i) $(x+y)^2$
(ii) $(x+y)^3$
(iii) $(x+y)^4$