9.5 Binomial Theorem

▼ Combination Formula

$$ {}_nC_j = \binom{n}{j} = \frac{n!}{j!(n-j)!} $$

▼ Examples

${}_5C_3$ $\binom{6}{2}$ ${}_3C_0$

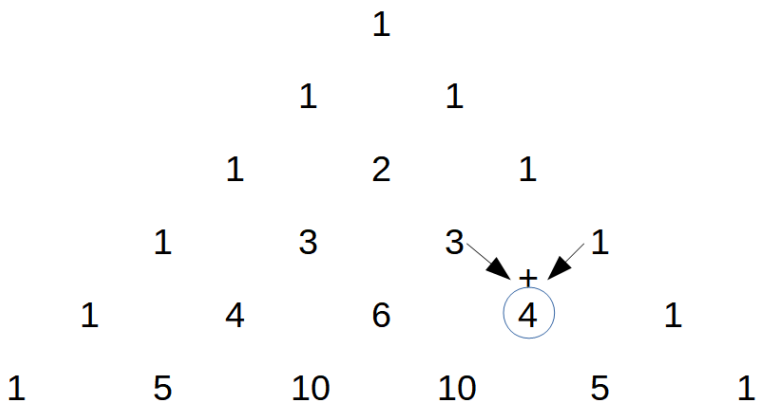
▼ Binomial Theorem

$$ (x+a)^n $$
$$ = \binom{n}{0} x^n + \binom{n}{1} a x^n + ... + \binom{n}{j} a^j x^{n-j} + ... + \binom{n}{n} a^n $$
$$ = \sum_{j=0}^{n} \binom{n}{j} x^{n-j} a^j $$

▼ Example 1: Expand using binomial theorem

$(x+2)^5$

▼ Pascals Triangle



▼ Example 2: Expand using binomial theorem

$(x-3)^4$

▼ Example 3: Expand using binomial theorem

$(2x+5)^3$

▼ The term containing x^j in the expansion of $(x+a)^n$

$$\binom{n}{n-j} a^{n-j} x^j$$

▼ Example: Find the 6th term in the series

$(x+2)^9$

▼ Example: Use the Binomial Theorem to find the numerical value of $(0.9999)^5$ correct to five decimal places. Hint: $(0.9999)^5 = (1-10^{-4})^5$