

$$x(x+1)^{100} = ?$$

BINOMIO DI NEWTON

$$(a+b)^n = \sum_{k=0}^n \binom{n}{k} a^{n-k} b^k \quad \binom{n}{k} = \frac{n!}{(n-k)!k!} \quad \text{COEFF. BINOMIALE}$$

ex

$$(a+b)^5 = \binom{5}{0} a^5 b^0 + \binom{5}{1} a^4 b^1 + \binom{5}{2} a^3 b^2 + \binom{5}{3} a^2 b^3 + \binom{5}{4} a^1 b^4 + \binom{5}{5} a^0 b^5 =$$

$$= a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5$$

PERTANTO:

$$(x+1)^{100} = \binom{100}{0} x^{100} \cdot 1^0 + \dots + \binom{100}{98} x^2 \cdot 1^{98} + \binom{100}{99} x^1 \cdot 1^{99} + \binom{100}{100} x^0 \cdot 1^{100} =$$

$$\binom{100}{0} = \frac{100!}{100!0!} = 1 \quad \binom{100}{98} = \frac{100!}{2!98!} = 50 \cdot 99 = 5950$$

$$\binom{100}{99} = \frac{100!}{1!99!} = 100 \quad \binom{100}{100} = \frac{100!}{0!100!} = 1$$

$$= x^{100} + \dots + 5950 x^2 + 100 x + 1$$

$$\leadsto x(x+1)^{100} = x \cdot x^{100} + \dots + 5950 x \cdot x^2 + 100 x \cdot x + 1 \cdot x =$$

$$= x^{101} + \dots + 5950 x^3 + 100 x^2 + x$$

\leadsto

Grado	Coeff. x^3	Coeff. x^2	Coeff. x	Coeff. x^0
101	5950	100	1	0