6.2 MULTIPLYING POLYNOMIALS

PASCALS TRIANGLE

n=0 → 1
n=1 → 1 1
n=2 → 1 2 1
n=3 → 1 3 3 1
n=4 → 1 4 6 4 1
n=5 → 1 5 10 10 5 1
⋮

BINOMIAL EXPANSION

$(a+b)^n$, n = whole #

1. There are n+1 terms
2. Coefficients are the numbers from the n^{th} row of Pascal's Δ.
3. The exponent of "a" is n on the first term & decreases by one each successive term
4. The exponent of "b" is zero on the first term & increases by one each successive term.
5. The sum of each of the exponents of any term is n.

EXAMPLE

Expand $(y-3)^4$ $a=y$ $b=-3$

*use coefficients from row 4 of Pascals Δ (14641)

$1y^4(-3)^0 + 4y^3(-3)^1 + 6y^2(-3)^2 + 4y^1(-3)^3 + 1y^0(-3)^4$

$1y^4 + (-12)y^3 + 6y^2(9) + 4y^1(-27) + (81)$

$\boxed{y^4 - 12y^3 + 54y^2 - 108y + 81}$

MULTIPLYING

EX $3x^2(x^3+4)$

$\boxed{3x^5 + 12x^2}$

EX $(x-2)(1+3x-x^2)$

$$\begin{array}{r} -x^2+3x+1 \\ \cdot \quad\quad x-2 \\ \hline 2x^2-6x-2 \\ -x^3+3x^2+1x+0 \\ \hline -x^3+5x^2-5x-2 \end{array}$$

[redacted]