6.9 Binomial Thm

Binomial in reference to polynomials

$1+5$

$a+b$

$7x^2y^2z^5 + 9x^3y^5z^2$

Is expansion of binomials uniform

$(a+b)^n$

two things in play

1- coefficients of the terms
Number in front of variable

2. Powers of each term

$(a+b)^2 = (a+b)(a+b)$

$= a^2+ab+ab+b^2$

$= a^2+2ab+b^2$

$= 1a^2b^0 + 2\cdot a^1b^1 + 1\cdot a^0b^2$

first term powers decrease

second term powers increase

$= 1 \quad 2 \quad 1$ row 2

$_2C_0 \quad _2C_1 \quad _2C_2$

Binomial Thm

$_nC_0 a^n b^0 + {}_nC_1 a^{n-1}b^1 + {}_nC_2 a^{n-2}b^2 + \ldots {}_nC_n a^0 b^n$

expand $(a+b)^6$

$1a^6b^0 + 6a^5b^1 + 15a^4b^2 + 20a^3b^3 + 15a^2b^4 + 6ab^5 + 1a^0b^6$

$a^6 + 6a^5b^1 + 15a^4b^2 + 20a^3b^3 + 15a^2b^4 + 6ab^5 + b^6$

$(2x+9)^3$

$1(2x)^3 9^0 + 3(2x)^2(9)^1 + 3(2x)^1(9)^2 + 1(2x)^0(9)^3$

$1\cdot 8x^3\cdot 1 + 3\cdot 4x^2\cdot 9 + 3\cdot 2x\cdot 81 + 1\cdot 1\cdot 729$

$8x^3 + 108x^2 + 486x + 729$

what is the 5th term of $(2x+3)^7$

$_7C_5 a^3b^4$

$35(2x)^3(3)^4$

$35\cdot 8x^3\cdot 81$

$22680x^3$

$(a-2)^4$

$1\cdot a^4(-2)^0 + 4\cdot a^3(-2)^1 + 6\cdot a^2(-2)^2 + 4a(-2)^3 + 1a^0(-2)^4$

$a^4 - 8a^3 + 24a^2 - 32a + 16$

when subtracting
the odd powered second terms are negative
the even powered second terms are positive