TYPES of POLYNOMIALS

MONOMIAL	BINOMIAL	TRINOMIAL	POLYNOMIAL
1 TERM	2 TERMS	3 TERMS	n TERMS
x, xy, $2xyz$	$x+y$ or $2x+y$ or $abc+2abd$	$x+y-z$	$n \geq 2$ $y = x^4+x^3+x^2+x+1$

degree 4

DEGREE of POLYNOMIALS

DEGREE of a TERM	DEGREE of a POLYNOMIAL
The sum of the exponents of the variables.	The highest degree of its terms.
Ex: What is the degree of: a) x^3 3 b) x^3y^4? $3+4=7$	**Ex:** What is the degree of $x^3y^4 + x^7y^1$? degree 7 8th degree degree is 8

CONSTANT	LINEAR	QUADRATIC	CUBIC
$5x^0$	$y = 2x+5$	$y = x^2$	$y = x^3$
has degree 0	has degree 1	has degree 2	has degree 3

$= 5 \cdot 1$
$= 5$

OPERATIONS of POLYNOMIALS

1) ADDING POLYNOMIALS

Note: When adding or subtracting, we collect "LIKE TERMS"

x and x^2 UNLIKE
x^2 and $2x^2$ LIKE

Ex: $f(x) = 5x^2 + 10x - 2$ and $g(x) = x^2 + 6$

$f(x) + g(x) = (5x^2 + 10x - 2) + (x^2 + 6)$
$= 5x^2 + x^2 + 10x - 2 + 6$
$= 6x^2 + 10x + 4$

2) SUBTRACTING POLYNOMIALS

Ex: $f(x) = 5x^2 + 10x - 2$ and $g(x) = -x^2 - 6$

$f(x) - g(x) = 5x^2 + 10x - 2 - 1(-x^2 - 6)$
$= (5x^2 + 10x - 2) + (+x^2 + 6)$
$= 6x^2 + 10x + 4$

PLS USE ( )

3) MULTIPLYING POLYNOMIALS

Note: The term from outside the brackets will multiply each term inside the bracket.

Ex 1: Using the distributive property: $5(x + 6) = 5x + 5(6) = 5x + 30$ ← bad form

$=5x+30$

$f(x) = 2x$ *and* $g(x) = 5x^2 + 7x$

$f(x).g(x) = 2x(5x^2+7x)$

$=10x^{1+2}+14x^{1+1}$

$=10x^3+14x^2$

- multiply coefficients (2x)
- apply multiplying powers rule

F O I L

Ex 2: Using the distributive property: $(x + 2)(x + 3) = (x)(x) + (x)(3) + (2)(x) + (2)(3)$

$= x^2 + 5x + 6$

$f(x) = 2x - 1$ *and* $g(x) = 5x + 7$

$f(x).g(x) = (2x-1)(5x+7) = 10x^2+14x-5x-7$

$=10x^2+9x-7$

exponent = repeated multiplication $x^3 = x \cdot x \cdot x$

4) SQUARING a BINOMIAL $(a + b)^2 = a^2 + 2ab + b^2$

Ex: $f(x) = x + 2$ $f(x)^2 = (x+2)^2$

$=(x+2)(x+2)$

$=x^2+4x+4$

$(x+2)^2 = x^2+2^2$

$(x \cdot y)^2 = x^2 \cdot y^2$

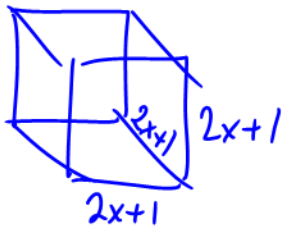
Thinking: Find an expression for the volume of a cube with side length 2x + 1. $V = l \cdot w \cdot h$ (length, width, height)

$V=(2x+1)^3$ → expand

$=(2x+1)(2x+1)(2x+1)$

$=(2x+1)(4x^2+2x+2x+1)$

$=(2x+1)(4x^2+4x+1)$



$=(2x)(4x^2)+(2x)(4x)+(2x)(1)+(1)(4x^2)+(1)(4x)+(1)(1)$

$=8x^3+8x^2+2x+4x^2+4x+1$

$=8x^3+12x^2+6x+1$