6.1 Polynomials Algebraic Characteristics

Is it a polynomial?

[a] $f(x) = x^3 + 3x$ — yes

[c] $f(x) = 6x^4 - 2x^{-1} + x$ — no

[b] $f(x) = x^4 + 3x - 2x^2 - 5^x$ — no

[d] $f(x) = -0.5x + \pi x^2 - \sqrt{2}$ — yes

Degree: The highest exponent of a polynomial.

Degree	Name	Example
0	Constant	3
1	Linear	$2x + 8$
2	Quadratic	$3x^2 + 2x - 5$
3	Cubic	$10x^3$
4	Quartic	$6x^4 - 8x^2$
5	Quintic	$-2x^5 + x^3 + x$
6+	6th Degree, etc.	$4x^6 + 7x^4 + 8$

Number of Terms: A string of expressions separated by plus, minus signs.

Terms	Name	Example
1	Monomial	$3x$
2	Binomial	$2y + 8$
3	Trinomial	$8x^2 + 5x - 2$
4	Polynomial	$6x^5 - 7x^4 + 4x - 1$

[Examples] Give the correct name for the polynomial.

① $4x^2 - 6x^3$
   Cubic Binomial

② $6x + 7 - 10x^2$
   Quadratic Trinomial

[new] Polynomial Algebraic Characteristics

STANDARD FORM — The terms of a polynomial are in standard form when they are ordered from left to right in decreasing order; which means from the largest exponent to the smallest

<u>DEGREE</u> — The largest exponent in the polynomial. It determines the <u>number</u> <u>of zeros</u>.

(Example) ⓐ $-7x + 9 - 4x^2$ — degree is 2.

ⓑ $3x^3 - 7x^5 - 2x$ —. degree is 5.

Sometimes... a polynomial may have multiple exponents in a term. The highest sum of exponents is the degree.

(example) ⓐ $-7xy^2 - 10x^2y^2 + 4x^3$ — degree is 4.

ⓑ $-5x^2y + 6$ — degree is 2.

<u>LEADING COEFFICIENT</u> — The <u>first coefficient</u> once in standard form.

<u>CONSTANT</u> — The term <u>without</u> a variable.