

Classifying Polynomials

- Term: each part of a polynomial separated by addition or subtraction
- Degree of a Term: the sum of the exponents of the variables in a term
- Degree of Polynomial: the highest degree of all the terms in a polynomial

Ex: Classify $3x^3 - 9x + 7$.

It is a trinomial because there are 3 terms separated by - and +

The degree of the 1st term is 3, the degree of the 2nd term is 1, and the degree of the 3rd term is 0. So, the degree of the polynomial is 3 since that is the highest degree of all the terms.

Classifying By Number of Terms:

- 1 term: monomial
- 2 terms: binomial
- 3 terms: trinomial
- ≥ 4 terms: n-term polynomial

Classifying Polynomials By Degree:

- 0: constant
- 1: linear
- 2: quadratic
- 3: cubic
- 4: quartic
- 5: quintic
- ≥ 6: nth degree

→ Is it a cubic trinomial

Adding & Subtracting Polynomials

Adding Polynomials:

1. Add like terms together.
2. Write your answer in Standard Form (decreasing order of degree).

Ex: $(4x^2 - 9) + (7x - 9x^2 + 8)$

$$(4x^2 - 9) + (7x - 9x^2 + 8)$$

$$= -5x^2 - 1 + 7x \rightarrow -5x^2 + 7x - 1$$

Subtracting Polynomials:

1. Turn into an addition problem by changing the - to + between the two polynomials and reversing the sign of each term in the second polynomial.
2. Add like terms together.
3. Write your answer in Standard Form.

Ex: $(3x^2 - 6x - 9) - (2x^2 + 8x - 3)$

$$\rightarrow (3x^2 - 6x - 9) + (-2x^2 - 8x + 3)$$

$$= x^2 - 14x - 6$$

Multiplying Polynomials

Monomial x Polynomial:

1. Use the Distributive Property to multiply the monomial by each term.
2. Write your answer in Standard Form.

Ex: $4x^2(3x^2 - 8x - 5)$

$$4x^2(3x^2 - 8x - 5)$$

$$= 12x^4 - 32x^3 - 20x^2$$

Binomial x Binomial:

1. FOIL (multiply the two first terms, the two outer terms, the two inner terms, and the two last terms).
2. Combine like terms and write your answer in Standard Form.

Ex: $(x + 3)(2x - 1)$

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

F: $2x^2$ O: $-1x$ I: $6x$ L: -3

$$= 2x^2 + 5x - 3$$

Any Polynomial x Any Polynomial:

1. Multiply each term from the first polynomial by each term in the second polynomial.
2. Combine like terms and write your answer in Standard Form.

Ex: $(x + 2)(x^2 - 3x - 8)$

$$(x + 2)(x^2 - 3x - 8)$$

$$= x^3 - 3x^2 - 8x + 2x^2 - 6x - 16$$

$$= x^3 - x^2 - 14x - 16$$

Classify each polynomial by its degree and number of terms.

76. $8x^3 - 9x$	77. $-2 - 4x^2 + 7x$	78. $8x^2y^2$	79. $6x + 5$
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Find each sum or difference. Write your answer in Standard Form.

80. $(2h^3 + 6h) + (3h^3 - 7h - 3)$	81. $(8x - 4x^2 + 3) - (7x^2 - 9)$	82. $(-14a^2 - 5) - (5a^2 + 6a - 7)$
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Find each product. Write your answer in Standard Form.

83. $5x^3(9x^2 + 4x - 5)$	84. $(x + 4)(x - 3)$	85. $(3n - 8)(4n - 7)$
86. $(2x + 3)(x^2 + x + 3)$	87. $(6x + 1)^2$	88. $4g(2g - 9)(2g + 9)$

Simplify each expression completely. Write your answer in Standard Form.

89. $(x + 2)(x + 8) + (4x^2 + 8x - 3)$	90. $(x + 5)(x - 5) - 6x(x + 1)$
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