



# Addition and Subtraction of Polynomials and Polynomial Functions



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# Polynomials: Basic Definitions

- A polynomial in  $x$  is defined as a finite sum of terms in the form  $ax^n$ .
- $n$  is a whole number.
- $a$  is a real number.
- $a$  is called the coefficient of the term.



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# Number of Terms

- Polynomials can be named by how many terms they have.
- *Monomial*: a polynomial with one term.
- *Binomial*: a polynomial with two terms.
- *Trinomial*: a polynomial with three terms.

- Degree of a Monomial – the sum of all the exponents.
- Degree of a Polynomial – the highest degree term.

Expression	Name	Degree
$2x^9$		
$10y - 7y^2$		
$5x^3y^2z$		
$2x^2 + 5x - 2$		



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# Addition of Polynomials

- “combine like terms”
- Like terms have exactly the same variables with the same powers.
- Examples:

Add the polynomials.

$$(3t^3 + 2t^2 - 5t) + (t^3 - 6t)$$

$$(-5a^2b - 6ab^2) + (2a^2b + ab^2)$$



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# Subtraction of Polynomials

- KEY: Distribute the negative
- In other words, add the opposite
- Example, what is the opposite of each polynomial?

$$-7z \quad 2p - 3q + r + 1 \quad -3x^2 + x - 2.2$$



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# Subtract the polynomials

$$(3x^2 + 2x - 5) - (4x^2 - 7x + 2)$$

$$(6x^2y - 2xy + 5) - (x^2y - 3)$$

$$(6a^2b - 2ab) - (-3a^2b + 2ab + 3)$$



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# Subtracting From

- Subtract 7 from 10.
- Subtract 12 from 4.
- Subtract  $(8t^2 - 4t - 3)$  from  $(-6t^2 + t + 2)$ .





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# polynomial functions

- A function defined by a polynomial

YES

NO

$$f(x) = 3x - 8$$

$$g(x) = 4x^5 - 2x^3 + 5x - 3$$

$$h(x) = -\frac{1}{2}x^4 + \frac{3}{5}x^3 - 4x^2 + \frac{5}{9}x - 1$$

$$m(x) = \frac{1}{x} - 8$$

$$q(x) = |x|$$