Variables and Expressions
Polynomials

A *variable* is a letter which stands for an unspecified number from a given set. We will agree that given set is the set of real numbers, unless told otherwise.

An *expression* is a collection of variables and constants connected by operation signs, such as +, -, etc., which stands for a number.

Definitions:

- Subtraction: $x - y$ means $x + (-y)$
- Division: $x \div y$ means $x \cdot \frac{1}{y}$
- Exponentiation: x^n means $\underbrace{x \cdot x \cdot \cdots \cdot x}_{n \text{ times}}$

Order of Operations PEMDAS

P - grouping symbols ( ) [ ] { } — ← vinculum

E - exponents

MD - mult. & div. from left to right

AS - add. & subt. " " " "

Absolute Value - distance from zero

$$|x| = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$

$|5| = 5$

$|-7| = 7$

$|0| = 0$

Polynomials

Polynomials are algebraic expressions that involve only the operations *addition* and *multiplication* of variables.

$3x+7 \quad x^2-4 \quad x^2y-3xy^4 \quad \frac{2}{3}x^3-\sqrt{7}x^4+\frac{x}{2} \quad |x+2| \quad \sqrt{x^2-3} \quad \sin x \quad \frac{3}{x}$

Polynomials are named based on two criteria:

- the number of terms
- the degree

# terms	name
1	monomial
2	binomial
3	trinomial
4 or more	polynomial with n terms

or a(n) n-term polynomial

degree	name
0	constant
1	linear
2	quadratic
3	cubic
4	quartic
5	quintic
6 or more	a(n) n^{th}-degree poly.