



The Major Topics of School Algebra

The National Mathematics Advisory Panel Report identifies the major topics of school algebra.

Selected Major Topics*

$$\frac{x+4}{7-y}$$

Symbols and Expressions

- Polynomial and rational expressions
- Arithmetic and finite geometric series

$$y = 3x - 2$$

Linear Equations

- Real numbers as points on the number line
- Linear equations/inequalities and their graphs
- Systems of simultaneous linear equations

$$b = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Quadratic Equations

- Factors/factoring of quadratic polynomials
- Completing the square in quadratic expressions
- Quadratic formula

$$f(x) = 2^x$$

Functions

- Linear, quadratic, and polynomial functions
- Nonlinear functions (e.g., square and cube root functions; absolute value; step functions)
- Exponential, logarithmic, and trigonometric functions

$$f(x) = a_n x^n + \dots + a_1 x + a_0$$

Algebra of Polynomials

- Roots and factorization of polynomials
- Complex numbers and operations
- Fundamental theorem of algebra

$$\begin{matrix} 1 & & & \\ & 1 & & \\ & & 1 & \\ & & & 1 \end{matrix}$$

Combinatorics and Finite Probability

- Applications of the binomial theorem and Pascal's Triangle

Practice 1: Topics of Algebra



- Teach for understanding of topics of school algebra
- Make linkages among topics
- Develop problem-solving skills
- Enhance teacher understanding
- Address misconceptions in learning algebra

Practice 2: Multiple Paths



- Establish a course sequence to cover all topics of school algebra
- Provide multiple curricular pathways to ensure success
- Ensure that students are ready for algebra before enrolling them in algebra courses
- Provide opportunities for all students to learn school algebra
- Use the topics of school algebra to inform standards, instructional materials, and assessments