



INDIANA ACADEMIC STANDARDS FRAMEWORKS

Mathematics: Grade 6

Overview

The *Algebra and Functions* domain is introduced in grade six and signifies a shift toward symbolic algebra and functions. The early grades built algebraic thinking by having students consider unknown quantities within arithmetic problems and work with properties of operations.

Grade four students are expected to show how the commutative and associative properties operate in numerical expressions.^{4.CA.3} In grade five, students apply these properties as they solve real-world problems with whole numbers, fractions, and decimals. In grade six, students apply the order of operations to evaluate numerical expressions^{6.NS.5} and use the properties of operations to create equivalent linear expressions and justify that two expressions are equivalent.^{6.NS.7} They also use variables to write algebraic expressions to solve real-world problems and evaluate those expressions for given values.^{6.AF.1} These experiences support work in grade seven when students create equivalent linear expressions that include factoring out a common number,^{7.AF.1} and these progressions of learning become the foundation of all equation and function work through grade eight and high school.

While students in kindergarten through grade five encountered verbal and numerical equations, and later elementary students used equations to model relationships between quantities or justify their reasoning, students in grade six begin to regularly use algebraic expressions, equations, and inequalities to model real-world problems. They extend their understanding of what it means to solve an algebraic equation^{6.AF.2} and they solve simple one-step linear equations with one variable.^{6.AF.3-4} In grade seven, students solve two-step linear equations and inequalities with one variable^{7.AF.3-4} and by grade eight they solve linear equations and inequalities with rational number coefficients in one variable fluently.^{8.AF.1}

Algebra and Functions	
Learning Outcome	Students evaluate algebraic expressions, write algebraic expressions to represent quantities in context, and create equivalent algebraic expressions.
Standard	6.AF.3: Solve equations of the form $x + p = q$, $x - p = q$, $px = q$, and $x/p = q$ fluently for cases in which p , q and x are all non-negative rational numbers. Represent real-world problems using equations of these forms and solve such problems. (E)
Evidence Statements	
Academic Vocabulary	
- Explain that a variable represents a number or a specific set of numbers. - Write one-step equations including positive rational numbers and one variable to represent the unknown quantity. - Solve one-step equations including positive	- Equation - Expression - Variable - Rational number - Inverse operation

rational numbers and one variable using the properties of equality. Solve real-world problems by writing an algebraic expression and solving using the properties of equality. Explain how the solution relates back to the original problem.	
Clarification Statements	Common Misconceptions
- Solving one-step algebraic equations is a foundational concept students will build upon in subsequent grade levels and should be mastered by the end of grade six. - Algebra is an abstract concept to students. Teachers should provide problems in context and real-world situations as frequently as possible to help students make connections between the abstract and representational levels. Use of algebra tiles is strongly encouraged to make deeper connections between abstract equations and concrete manipulatives. - Balance and the meaning of the equal sign are two important, interwoven concepts when solving algebraic equations. Students must understand the equal sign does not signal an operation must be performed, but rather the relationship between the left and the right side of the equation is balanced. As students solve algebraic equations, both sides of the equation must stay balanced. - The properties of equality for addition, subtraction, multiplication, and division are used to solve for the unknown variable. It is important teachers understand these properties, however, students do not need to formally know these terms. Explaining that students will use the inverse operation as the one within the equation to solve is sufficient at grade six. - In addition to modeling equations with algebra tiles, teachers will want to model how to solve real-world problems using tape diagrams or bar models. See the Building Thinking Blocks Algebra Videos from Math Playground in the Instructional Resource section below for examples.	- Students may believe the equal sign signifies that an operation must be performed on the left and the result of the operation is written on the right. - Students may misinterpret a variable as a label. - Students may not know how to interpret the symbols for inequalities. - Students may perform the inverse operation on one side of the equation but forget to perform it on the other side resulting in an unbalanced equation.
Looking Back	Looking Ahead

This concept is not specifically addressed in the Indiana Academic Standards prior to this grade level.

7.AF.3: Solve equations of the form $px + q = r$ and $p(x + q) = r$ fluently, where p , q , and r are specific rational numbers. Represent real-world problems using equations of these forms and solve such problems. (E)

Instructional Resources

- [Mathematics Grades 5-6 Vertical Articulation Guide](#)
- [Mathematics Grades 6-8 Vertical Articulation Guide](#)
- [Learning Progressions & Content Supports: Grade 6 through Grade 8](#)
- [Implementing the Mathematical Process Standards: Grades Six through Eight](#)
- [Illustrative Mathematics-Firefighter Allocation](#)
- [Illustrative Mathematics-Fruit Salad](#)
- [Illustrative Mathematics-Morning Walk](#)
- [Open Middle-Solving One-Step Equations \(Greatest Solution\)](#)
- [Open Middle-Solving One-Step Equations 2](#)
- [Math Playground-Building Thinking Blocks \(Algebra Videos\)](#)
- [Tools for Teachers-What is the Meaning of X? \(Login Instructions\)](#)
- [SolveMe Mobiles](#)
- [Open Up Resources-Expressions and Equations: Lessons 3-5](#)
- [MathsBot-Algebra Tiles and Activities](#)
- [Mathigon-Balance Scale Polypads](#)

Universal Supports for All Learners

- [2024 Content Connectors](#)
- [Universal Design for Learning Playbook](#)
- [UDL Guideline Infographic, from Learning Designed](#)
- [UDL Tips from CAST](#)
- [Mathematics Learning Recovery Series: Part 2-Addressing the Gaps in Student Learning](#)
- [Mathematics Learning Recovery Series: Part 3-Instructional Strategies for All Learners](#)

Instructional Strategies

- [What Works Clearinghouse-Concrete-Semi-Concrete-Abstract Video \(Print Recommendations\)](#)
- [What Works Clearinghouse-Clear & Concise Mathematical Language Video \(Print Recommendations\)](#)
- [NYSED-Frayer Vocabulary Model Scaffolding Example & Template](#)
- [Magma Math: Math Teaching Practices](#)
- [Problem Solving Instructional Support](#)
- [WIDA-Doing and Talking Mathematics: A Teachers Guide to Meaning-Making with English Learners](#)
- [Virginia Department of Education Students with Disabilities in Mathematics Frequently Asked Questions](#)

Assessment Considerations

- [ILEARN Test Blueprint: Mathematics 2025-2026 \(Spreadsheet\)](#)
- [ILEARN Test Blueprint: Mathematics 2025-2026 \(PDF\)](#)
- [IDOE Released Items Repository](#)
- [I AM - Indiana's Alternate Measure](#)
- [Quality Mathematic Items for Classroom Assessments \(Featuring New ILEARN Item Specifications\)](#)
- [Grade 6 ILEARN Math Desmos 4-Function Calculator](#)
- [UDL Assessment Strategies](#)

Interdisciplinary Connections

Coming Soon

Disciplinary Literacy

Coming Soon

Contact IDOE's [Office of Teaching and Learning](#) with any questions.