



# INDIANA ACADEMIC STANDARDS FRAMEWORKS

## Mathematics: Grade 7

### Overview

Grade five *Number Sense* standards call for students to explain the patterns in the number of zeros when multiplying a number by powers of 10,<sup>5.NS.3</sup> and grade six students evaluate positive rational numbers with whole number exponents.<sup>6.NS.8</sup> Students in grade six also learn to find the greatest common factor of number pairs up to 100 and the least common multiple of pairs of numbers up to 12.<sup>6.NS.6</sup> In grade seven, students extend earlier learning to express the prime factorization of whole numbers using exponents.<sup>7.NS.5</sup> They also understand and apply the inverse relationship between perfect squares and square roots,<sup>7.NS.6</sup> which supports grade eight standards about the properties of exponents.<sup>8.NS.3</sup>

In grade five, students use number lines to compare fractions, mixed numbers, and decimals.<sup>5.NS.1</sup> In grade six, they compare and order rational numbers using number lines,<sup>6.NS.3</sup> and by grade seven, they use number lines to show the distance between two rational numbers and find the sums in real-world contexts.<sup>7.NS.1-2</sup> Students in grade eight deepen their understanding of rational and irrational numbers by explaining differences between them, finding decimal equivalents, and using approximations to compare irrational numbers.<sup>8.NS.1-2</sup>

Through the early grades, students learn to apply all four operations to whole numbers, and in later elementary they build fluency with operations on fractions and decimals. Students begin to work with negative integers in grade six, using them to model real-world quantities<sup>6.NS.1</sup>, and represent opposite signed numbers on a number line.<sup>6.NS.2</sup> These ideas support the *Number Sense* standards in grade seven as students relate absolute value to addition and subtraction on a number line and understand subtraction as adding the additive inverse.<sup>7.NS.1-2</sup> Grade seven students are able to explain the rules for operations with integers<sup>7.NS.3-4</sup> and are expected to compute fluently with rational numbers using an algorithmic approach.<sup>7.NS.7</sup>

Number Sense	
Learning Outcome	Students connect earlier learning to express the prime factorization of whole numbers using exponents, understand the inverse relationship between perfect squares and square roots, and use number lines to compare and order rational and irrational numbers.
Standard	<b>7.NS.3:</b> Use the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. (E)
Evidence Statements	Academic Vocabulary
<ul style="list-style-type: none"><li>Use a number line to model multiplication of two rational numbers, one positive, one</li></ul>	<ul style="list-style-type: none"><li>Product</li><li>Distributive property</li></ul>

<p>negative.</p> <ul style="list-style-type: none"> <li>• Apply the properties of operations, including the distributive property, to simplify expressions and evaluate products involving signed numbers.</li> <li>• Explain the significance of the distributive property in algebraic reasoning and its connection to the rules for multiplying signed numbers.</li> <li>• Apply the rules for multiplying signed numbers to simplify expressions.</li> <li>• Develop fluency through practice with multiplication of rational numbers.</li> </ul>	<ul style="list-style-type: none"> <li>• Simplify</li> <li>• Expressions</li> <li>• Numerical Equations</li> </ul>
Clarification Statements	Common Misconceptions
<ul style="list-style-type: none"> <li>• Students should be able to use the distributive property to provide a mathematical justification for numerical statements involving signed numbers.</li> <li>• To multiply two rational numbers that have the <i>same sign</i>, multiply their absolute values. The product is positive.  <math>(+) (+) = (+)</math>  <math>(-) (-) = (+)</math> </li> <li>• To multiply two rational numbers that have <i>opposite signs</i>, multiply their absolute values. The product is negative.  <math>(+) (-) = (-)</math>  <math>(-) (+) = (-)</math> </li> <li>• <a href="#">Properties of Operations Table</a></li> </ul>	<ul style="list-style-type: none"> <li>• Students may distribute the negative sign to only one term in an expression or struggle to apply the distributive property correctly when dealing with signed numbers.</li> </ul>
Looking Back	Looking Ahead
<p><b>6.NS.5:</b> Apply the order of operations and properties of operations (i.e., identity, inverse, commutative properties of addition and multiplication, associative properties of addition and multiplication, and distributive property) to evaluate numerical expressions with nonnegative rational numbers, including those using grouping symbols, such as parentheses, and involving whole number exponents. (E)</p>	<p>This concept is not specifically addressed in the Indiana Academic Standards in the subsequent grade levels.</p>
Instructional Resources	
<ul style="list-style-type: none"> <li>• <a href="#">Mathematics Grades 6-8 Vertical Articulation Guide</a></li> <li>• <a href="#">Learning Progressions &amp; Content Supports: Grade 6 through Grade 8</a></li> <li>• <a href="#">Implementing the Mathematics Process Standards: Grades Six to Eight</a></li> </ul>	

- [Illustrative Mathematics - Why is a negative times a negative always a positive?](#)
- [Illustrative Mathematics - Distributive Property](#)
- [Open Up Resources - Multiply Rational Numbers](#)

### 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 7 & 8 ILEARN Math Desmos Scientific Calculator](#)
- [UDL Assessment Strategies](#)

### Interdisciplinary Connections

*Coming Soon*

### Disciplinary Literacy

*Coming Soon*

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