Essential Topic 1: Algebra Essentials and Properties of Exponents

Content Area: **Mathematics**
Course(s): **Algebra 1**
Time Period: **Semester 1**
Length: **7 weeks**
Status: **Published**

Standards

MA.N-RN.A.1	Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.
MA.A-SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.
MA.A-SSE.A.1b	Interpret complicated expressions by viewing one or more of their parts as a single entity.
MA.N-RN.A.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.
MA.N-RN.B.3	Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.
MA.A-SSE.A.2	Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.
MA.A-SSE.B.3c	Use the properties of exponents to transform expressions for exponential functions.
MA.A-APR.A.1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
MA.A-CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
MA.A-REI.A.1	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
MA.A-REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Enduring Understandings

1. Mathematics is a language consisting of symbols and rules

2. The same mathematical ideas can be represented concretely or symbolically

3. There can be different strategies to solve a problem, but some are more effective and efficient than others are.

Essential Questions

1. Which operations and equivalences will simplify and help solve the problem?

2. How does explaining my process help improve my understanding a problem's solution better?

3. How are algebraic expressions simplified using the properties of exponents?

4. What is meant by equality?

5. What is meant by a linear equation?

Knowledge and Skills

Algebra Essentials and Linear Equations:

- Introduction to Algebra - Properties(commutative, associative, distributive), adding and subtracting signed numbers, Multiplication & Division Rules, and Reciprocals
- Solve one-step and multi-step linear equations
- Solve linear equations with variables on both sides
- Solve literal equations for an indicated variable
- Word Problems - consecutive integers, area, perimeter, age word problems
- Distinguish between rational and irrational numbers
- Solve and graph linear inequalities with one variable
- Find the intersection and union of two graphs
- Solve absolute value equations

Properties of Exponents:

- Evaluate expressions involving exponents
- Add, subtract, and multiply polynomials
- Simplify expressions using properties of exponents
- Use zero and negative exponents

Transfer Goals

1. Which operations and equivalences will simplify and help solve the problem?

2. How does explaining my process help me to understand a problem's solution better?

3. How are algebraic expressions simplified using the laws of advanced numbers?

4. What is meant by equality?

Resources

Holt Algebra 1 by Nichols Holt/1992 ISBN:0-03-005419-2
Algebra Structure and Method Book 1 by Brown McDougal Little/2000 ISBN:0-395-97722-3

graphing calculators

Khan Academy

PurpleMath

KutaSoftware

CK-12

Quizlet

Albert I/O

Desmos

Problem-Attic

Classkick