

# 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.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-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.  |
| 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.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.A-SSE.B.3c | Use the properties of exponents to transform expressions for exponential functions.   |

## 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](#)