# Unit 1: Real Numbers and Their Properties

Content Area: **Mathematics**
Course(s): **Algebra 8**
Time Period: **September**
Length: **4 weeks**
Status: **Published**

## Transfer

**Big Idea: Real Number & Their Properties**

## Essential Questions

How do I determine the best numerical representation (pictorial, symbolic objects) for a given situation?

Can expressions that appear to be different be equivalent?

## Enduring Understandings

All of the facts of arithmetic and algebra follow from certain properties.

Variables in place of numbers allow the statement of relationship among numbers that are unknown or unspecified.

## Critical Knowledge and Skills

## Vocabulary

**Vocabulary**

Absolute Value, Additive Inverse, Algebraic Expression, Base, Coefficient, Constant, Distributive Property, Element of the Set, Equation, Equivalent Expressions, Evaluate, Exponent, Integer, Irrational Number, Like Terms, Multiplicative Inverse, Natural Number, Numerical Expression, Opposite, Order of Operations, Perfect Square, Power, Quantity, Radical, Radicand, Rational Number, Real, Reciprocal, Set, Square Root, Subset, Term, Variable, Whole Number

## Learning Objectives

Write algebraic expressions (A.SSE.1.a)

Simplify expressions involving exponents (A.SSE.1.a)

Use the order of operations to evaluate expressions (A.SSE.1.a)

Classify, graph, and compare real numbers (N.RN.3)

Find and estimate square roots (N.RN.3)

Identify and use properties of real numbers (N.RN.3)

Find sums, differences, products, and quotients of real numbers (N.RN.3)

Use the Distributive Property to simplify expressions (A.SSE.1.a)

## Resources

Polygraph: Rational Irrational Numbers

Illuminations Distributing & Factoring Using Area

TED Ed: Infinite Hotel

Desmos: Pentomino Puzzles

Magic Squares

Desmos: Expressions Mash-Up

Khan Academy: Irrational Numbers

## Standards

RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP11. Use technology to enhance productivity.

9.1.8.A.2 Relate how career choices, education choices, skills, entrepreneurship, and economic conditions affect income.

9.1.8.C.5 Calculate the cost of borrowing various amounts of money using different types of credit (e.g., credit cards, installment loans, mortgages).

9.1.8.D.3 Differentiate among various investment options.

9.1.8.E.6 Compare the value of goods or services from different sellers when purchasing large quantities and small quantities.

9.2.8.B.7 Evaluate the impact of online activities and social media on employer decisions.

8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.

8.2.8.C.8 Develop a proposal for a chosen solution that include models (physical, graphical or mathematical) to communicate the solution to peers.

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| MA.A-SSE.A | Interpret the structure of expressions |
| | Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches. |
| MA.K-12.2 | Reason abstractly and quantitatively. |
| MA.A-SSE.A.1a | Interpret parts of an expression, such as terms, factors, and coefficients. |

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| MA.K-12.3 | Construct viable arguments and critique the reasoning of others. |
| MA.N-RN.B | Use properties of rational and irrational numbers. |
| 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.K-12.4 | Model with mathematics. |
| MA.K-12.7 | Look for and make use of structure. |
| MA.K-12.8 | Look for and express regularity in repeated reasoning. |