

Unit 1

Equations and Inequalities

Algebra I

Unit Description:

Building upon prior grade level standards, students will recognize and generalize patterns using words, tables, expressions, and graphs. Students will also write and solve linear equations and inequalities.

Standards for Mathematical Practice

- MP.1 Make sense of problems and persevere in solving them.
- MP.2 Reason abstractly and quantitatively.
- MP.3 Construct viable arguments and critique the reasoning of others.
- MP.4 Model with mathematics.
- MP.5 Use appropriate tools strategically.
- MP.6 Attend to precision.
- MP.7 Look for and make use of structure.
- MP.8 Look for and express regularity in repeated reasoning.

Louisiana Student Standards for Mathematics (LSSM)

Parts of standards that are addressed in later units have been ~~crossed out~~.

SSE – Seeing Structure in Expressions	
A. Interpret the structure of expressions.	
A-SSE.A.1	Interpret expressions that represent a quantity in terms of its context. ★ a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. <i>For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.</i>
CED – Creating Equations	
A. Create equations that describe numbers or relationships.	
A-CED.A.1	Create equations and inequalities in one variable and use them to solve problems. <i>Include equations arising from linear, quadratic, and exponential functions.</i> ★
A-CED.A.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities , and interpret solutions as viable or nonviable options in a modeling context. <i>For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.</i> ★

A-CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. <i>For example, rearrange Ohm's law $V = IR$ to highlight resistance R.</i>
REI – Reasoning with Equations and Inequalities	
A. Understand solving equations as a process of reasoning and explain the reasoning.	
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.
B. Solve equations and inequalities in one variable.	
A-REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
N-Q Quantities	
A. Reason quantitatively and use units to solve problems.	
N-Q-A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. *
N-Q-A.2	Define appropriate quantities for the purpose of descriptive modeling. *

***As defined by LSSM, the basic modeling cycle involves:**

1. identifying variables in the situation and selecting those that represent essential features,
2. formulating a model by creating and selecting geometric, graphical, tabular, algebraic, or statistical representations that describe relationships between the variables,
3. analyzing and performing operations on these relationships to draw conclusions,
4. interpreting the results of the mathematics in terms of the original situation,
5. validating the conclusions by comparing them with the situation, and then either improving the model or, if it is acceptable,
6. reporting on the conclusions and the reasoning behind them.

Choices, assumptions, and approximations are present throughout this cycle.

Enduring Understandings:

- The different parts of expressions can represent certain values in the context of a situation.
- Linear equations and inequalities can be modeled with technology.
- Mathematical models can both clarify and distort the meaning of data.
- Making an informed decision often involves comparing and contrasting linear relationships.
- Integration of various mathematical procedures builds a stronger foundation of finding solutions.

Essential Questions:

- How can I use patterns to establish relationships that will help make decisions in real-life situations?
- How can verbal, numerical, graphical and analytical representations be used to analyze and solve problems?
- How can I write and solve equations and inequalities?
- How do changes in equations lead to changes in graphs?
- What makes alternative algebraic algorithms both effective and efficient?