HPISD Curriculum: Algebra I

Title	Estimated Duration	6 Weeks					
Unit 2: Solving Linear Equations with Ratio and Proportions	3 weeks	**1**	**2**	3	4	5	6

Unit Overview

Application of properties of real numbers and properties of equality to solve linear equations and inequalities in one variable, translation of verbal descriptions of numerical relationships into symbolic form, simplifying expressions, function notation.

Students write ratios and solve proportions using similar triangles, other geometric figures, and word problems. They solve percent problems and find percent of change.

Enduring Understandings

The student will understand that:

- An equation can be solved by using addition, subtraction, multiplication, and or division properties of equality using the additive and multiplicative inverses.
- An equation involving more than one operation and/or more than one variable term can be solved systematically using a multi-step process.
- The solution to a linear equation is either a real number, all real numbers, or does not exist. The student will understand that a multi-variable equation/formula can be solved for a specified variable.
- Equations and inequalities arise as a way of asking and answering questions involving functional relationships.
- Real-life problems can be solved using an equation to represent quantities such as perimeter, consecutive integers, or angles of a triangle.
- A ratio is a multiplicative comparison of two or more quantities.
- A proportion states that two ratios are equivalent.
- Proportional relationships between similar figures can be used to find unknown lengths of the figures.

Concepts	Guiding/Essential Questions
• number • properties • equality • proportion • relationships • change •	• What does isolate the variable mean? • What are the steps used to isolate the variable? • What is the order of operations? • What are like terms? • What are consecutive integers? • What are consecutive even and odd integers? • When will a solution result in all real numbers? • When will a solution result in no solution? • What are the steps used to solve for a single variable? • What is the relationship between a ratio and a proportion?

	• What are the steps used to solve for a single variable in a proportion? • How are similar figures used to solve problems? • What does percent mean? • How can percent problems be solved? • How can the percent of change be determined? • How can the new amount be found in a percent of change problem? • How can answers to percent of change problems be checked for correctness?

Learning Targets

The students will demonstrate an understanding of the properties and attributes of functions and formulate and use linear equations and inequalities to solve problems.

Students will demonstrate an understanding of properties and attributes of functions. They should be able to formulate and use linear equations and inequalities in connection with percents, proportions, probability, and statistics in application problems and with geometric shapes.

Formative Assessments	Summative Assessments
homework, quizzes	test

TEKS: Readiness Standards	TEKS: Related Supporting Standards
A.1D Represent relationships among quantities using concrete models, tables, graphs, diagrams, verbal descriptions, equations, and inequalities. **A.1E** Interpret and make decisions, predictions, and critical judgments from functional relationships. **A.4A** Find specific function values, simplify polynomial expressions, transform and solve equations, and factor as necessary in problem situations. **A.7B** Investigate methods for solving linear equations ~~and inequalities~~ using concrete models, graphs, and the properties of equality, select a method, and solve the equations ~~and inequalities~~	**A.3A** Use symbols to represent unknowns and variables. **A.4B** Use the commutative, associative, and distributive properties to simplify algebraic expressions. **A.7C** Interpret and determine the reasonableness of solutions to linear equations ~~and inequalities~~ **A.1** Foundation concepts for high school mathematics. Build on knowledge of the basic understandings of number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry; measurement; and probability and statistics. **A.6** Underlying mathematical processes. Use multiple representations, technology, applications and modeling, and numerical fluency in problem-solving contexts.

Processes and Skills: **What students should be able to DO**	**Facts:** **What students should KNOW**
• Use the distributive property to simplify expressions in order to solve equations and inequalities. • Solve one, two, and multiple step equations and inequalities. • Use consecutive integers to solve application problems. • Use properties of equality and inverse properties to solve equations and inequalities. • Combine like terms to simplify expressions • Translate a verbal description of a numerical relationship into a symbolic representation • Identify and write a ratio between two quantities • Identify and express a proportion between two equal ratios. • Generate equivalent ratios • Determine whether two ratios are equivalent • Use properties of similar figures to find unknown lengths of geometric figures. • Solve percent problems and percent change problems.	• Variables represent values in algebraic expressions • Variables in equations can be solved using rules and order of operations. • Solving for a variable means to isolate the variable. • Operations must be used to isolate the variable to keep the equation balanced on each side. • The distributive property must often be used to remove parenthesis and simplify expressions. • Like terms have the same variables with the same exponents. • Cross multiplication can be used to solve proportions with unknown numbers.

Topics

properties of equality	equations	inequalities
solving for unknowns	inverse operations	ratio
similarity	scale factor	proportion
		percent

Language of Instruction

addition property of equality	domain	scale drawing
coefficient	equation	scale factor
congruent figures	inequality	scale model
consecutive integers	inverse operations	similar figures
consecutive even integers	like terms	solution
consecutive odd integers	multiplication property of equality	triangle sum theorem
constant	multi-step equations	variable
corresponding parts of triangles	proportion	
cross product	scale	

State Assessment Connections	National Assessment Connections

Resources
McDougal Littell - Chapter 3 (1st half) Teacher-made worksheets