

Unit 2: Solving Linear Equations

Content Area: **Mathematics**
Course(s): **Mathematics**
Time Period: **Week 5**
Length: **5 Weeks**
Status: **Published**

Unit Overview

In this unit on quantities and reasoning with equations, students will use properties of equality and the distributive property to solve one, two, and multi-step linear equations in one variable. These will include equations with variables on both sides and equations with no real solutions or infinite solutions. They will write and solve proportions and apply them to percent problems and problems with similar figures. Students will finish the unit by rewriting equations and formulas.

Standards

CCSS.Math.Content.HSA-SSE.A.1	Interpret expressions that represent a quantity in terms of its context.
CCSS.Math.Content.HSA-SSE.A.1.a	Interpret parts of an expression, such as terms, factors, and coefficients.
CCSS.Math.Content.7.RP.A.2	Recognize and represent proportional relationships between quantities.
CCSS.Math.Content.HSA-SSE.A.1.b	Interpret complicated expressions by viewing one or more of their parts as a single entity.
CCSS.Math.Content.7.RP.A.2.a	Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
CCSS.Math.Content.7.RP.A.2.c	Represent proportional relationships by equations.
CCSS.Math.Content.7.RP.A.3	Use proportional relationships to solve multistep ratio and percent problems.
CCSS.Math.Content.8.EE.C.7	Solve linear equations in one variable.
CCSS.Math.Content.8.EE.C.7.a	Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).
CCSS.Math.Content.8.EE.C.7.b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
CCSS.Math.Content.7.EE.B.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
CCSS.Math.Content.HSA-CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
CCSS.Math.Content.HSA-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.
CCSS.Math.Content.7.G.A.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

Essential Questions

- How can mathematical models be used to clarify mathematical relationships?
- How can mathematical models be used to describe physical relationships?

Application of Knowledge and Skills...

Students will know that...

Students will know that:

- 1. inverse operations can be used to solve equations.
- 2. a linear equation can have one solution, no solution, or infinite solutions.
- 3. two equal ratios form a proportion.
- 4. proportions can be solved using cross products.
- 5. similar figures are proportional.
- 6. scale models are used to represent life-sized models.
- 7. formulas are used to simplify and solve problems.

Students will be skilled at...

Students will be able to:

- a. solve one, two, and multi-step equations.
- b. solve equations with variables on both sides.
- c. find ratios and write and solve proportions.
- d. solve proportions using cross products.
- e. use similar figures to solve problems.
- f. solve percent problems and percent application problems.
- g. solve percent of change problems.
- h. rewrite equations and formulas.

Assessments

- Communicator Practice Diagnostic: Other written assessments Students will solve practice problems on communicators to receive immediate feedback
- Daily Warm-Up Problems Diagnostic: Other written assessments Students will complete daily warm-up problems to assess readiness
- Quiz 1 Formative: Written Test Students will solve one, two, and multi-step equations with variables on both sides (including those with no real solutions and infinite solutions).
- Quiz 2 Formative: Written Test Students will take a quiz on proportion and percent problems including percent of change and application problems.
- Students will complete one or two problems to assess knowledge and skills learned during the class period
- Ticket to Leave Problems Formative: Other written assessments
- Unit Test Summative: Written Test Students will complete a test on all topics covered in the unit

Activities

Modeling One-Step Equations using Algebra Tiles

Students will use algebra tiles to model one-step equations using addition and subtraction.

Exploring Multi-step Equations Game

Students will play a game in small groups to practice solving equations.

Road Trip Project (with optional challenge questions)

Students will plan a road trip in the United States and will use their knowledge of scale and proportions to solve problems.

Kooshball Percent/Proportion Game

Students will play an interactive game with problems on percents and proportions.

Exploring Proportions in Similar Triangles Activity

Students will explore proportions that exist in similar triangles.

Capture-Recapture Activity

Students will complete an activity using dried beans to explore the capture-recapture method used with

wildlife populations.

Investigating Percents of Change Activity

Students will compare their heart rate before and after exercising and calculate the percent of change.

✖ [Discovering Math: Ration and Proportions Video](#) ✖

Activities to Differentiate Instruction

Mixed-ability grouping

Interactive Smart Board activities

Multi-Step Problem Solving

Math stations

Cooperative learning

Study guides (teacher and student completed)

Modify tests and homework as needed

Modified grading rubrics

Graphic organizers

Communicator response boards

Extended response questions

Challenge and enrichment homework and worksheets

Optional weekly challenge problems

Integrated/Cross-Disciplinary Instruction

Resources

McDougal Littell Algebra 1 textbook and resource materials

Website: www.classzone.com (see link)

Kuta Software

Algebra with Pizzazz

Punchline Algebra

Smart Exchange Website (see link)

NJ Ask Review Workbook Grade 7

 [McDougal Littel website](#) 

 [Smart Exchange Website](#) 