

Unit 2: Solving Equations

Algebra Prep

11 Class Meetings

Created July 2020

Essential Questions

- How can an understanding of the number properties help you solve equations that can represent real-world situations?
- How can you analyze, model, and solve mathematical situations using algebraic equations?

Enduring Understandings with Unit Goals

EU 1: Properties can be used to simplify mathematical expressions.

- Apply the distributive property to evaluate expressions.
- Evaluate and simplify expressions by combining like terms.

EU 2: Properties of real numbers, properties of equality, and inverse operations can be used to obtain a solution to a linear equation and model real-world situations.

- Utilize inverse operations to solve one- and two-step equations.

EU 3: There is a precise order to solving multi-step equations.

- Apply the five steps to solving multi-step equations to isolate a variable.

Standards

Common Core State Standards:

- **8.EE.C.7:** Solve linear equations in one variable.
- **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).
 - **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).
- **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.

ISAAC Vision of the Graduate Competencies

Competency 1: Write effectively for a variety of purposes.

Competency 2: Speak to diverse audiences in an accountable manner.

Competency 3: Develop the behaviors needed to interact and contribute with others on a team.

Competency 4: Analyze and solve problems independently and collaboratively.

Competency 5: Be responsible, creative, and empathetic members of the community.

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Unit Content Overview

1. Distributive Property and Combining Like Terms

- Identify parts of a variable expression
- Simplify expressions

2. Identifying a Solution

- Determine whether a value is a solution to an equation

3. Solving One-Step Equations

- Use the Addition and Subtraction Properties of Equality
- Apply the Multiplication and Division Properties of Equality
- Solve equations using reciprocals
- Write equations to solve word problems

4. Solving Two-Step Equations

- Solve a two-step equation
- Solve equations with two terms in the numerator
- Write equations to solve word problems

5. Solving Multi-Step Equations

- Solve equations that require combining like terms
- Solve an equation using the distributive property
- Solve an equation that contains fractions
- Solve an equation that contains decimals
- Create equations to solve word problems

6. Solving Equations with Variables on Both Sides

- Solve an equation with variables on both sides
- Create equations to solve word problems
- Analyze and explain equations with infinite, no solution and one solution.

Interdisciplinary Connection:

- Language Arts - Word Problems
- Science – Word Problems

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Daily Learning Objectives with *Do Now Activities*

Students will be able to...

- Simplify and justify expressions using the distributive property
- Distinguish and combine like terms of real numbers
 - *How do you know if two things are considered like terms?*
- Determine if a value is a solution to an equation
- Solve and explain one-step equations in one variable
- Apply inverse operations to solve two-step equations
 - *Solve the following problem. Was there anything confusing about it? Explain.*
- Translate real world problems into one- and two-step equations
 - *Solve a word problem. Explain your solution process.*
- Apply inverse operations in the correct order to solve multi-step equations in one variable
 - *Do you follow PEMDAS when you solve equations?*
- Solve and explain equations with variables on both sides
 - *What strategies have we learned for analyzing, modeling, and solving mathematical equations using algebra?*
- Solve and justify equations that have one solution, no solution or infinitely many solutions.
 - *Solve the following problem. Explain why this equation is special or different from the others.*

Instructional Strategies/Differentiated Instruction

- Whole-group instruction
- Graphic organizers
- Creating authentic connections for students
- Rephrasing and restatement of information and concepts
- Guided notes
- Student-led instruction
- Small group instruction
- Independent problem-solving
- Collaborative problem-solving
- Cross-curricular problem solving (independent and collaborative)
- Accountable Talk
- Manipulatives
- Word walls with visuals
- Homework

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Assessments

FORMATIVE ASSESSMENTS:

- Warm ups (SBAC)
- ABCD Cards
- Whiteboards
- Mid-class check-ins
- Exit Slips
- Student-led instruction
- Homework
- Accountable Talk Discussions
- Do Now Activity
- Performance Task - **Cell Phone**
Future Rubric Assessment in 2021-2022

SUMMATIVE ASSESSMENTS:

- Quiz 1 – EU 1, 2
- Quiz 2 – EU 2, 3
- Unit 2 Test – IAB: Expressions and Equations 1
- Performance Task - **Cell Phone**

Unit Task

Unit Task Name: Cell Phone

Description: Students will use information learned in this unit about how there are properties that can be used to simplify mathematical expressions (EU 1), how inverse operations can be used to solve linear equations (EU 2), and how there is a precise order to solving multi-step equations (EU 3) in order to complete a set of tasks specific to cell phone usage. Students will be investigating cell phones and their features. They will be asked to write and solve a series of problems as well as review and apply the algebraic terms and concepts learned in this unit.

Evaluation: Summative Assessment and Future Rubric in 2021-2022 school year

Unit Resources

- Flipped Google Classroom Videos
- Worksheets
- Calculator
- Laptops
- SBAC Prep Online
- Kahn Academy

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- Match Fishtank
- Map.Mathshell.org
- Online resources