

Unit 2: Linear Equations in One Variable

Cluster: Analyze and solve linear equations and pairs of simultaneous linear equations.

Nevada Academic Content Standard	What does this standard mean that a student will know and be able to do? (adapted from North Carolina 8 th Grade Standards, Unpacked Content)
<p>8.EE.C.7 Solve linear equations in one variable.</p> <p>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).</p> <p>b) Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.</p>	<p>Students solve one-variable equations including those with the variables being on both sides of the equals sign. Students recognize that the solution to the equation is the value(s) of the variable, which make a true equality when substituted back into the equation. Equations shall include rational numbers, distributive property and combining like terms.</p> <p><i>Example 1:</i> Equations have one solution when the variables do not cancel out. For example, $10x - 23 = 29 - 3x$ can be solved to $x = 4$. This means that when the value of x is 4, both sides will be equal. If each side of the equation were treated as a linear equation and graphed, the solution of the equation represents the coordinates of the point where the two lines would intersect. In this example, the ordered pair would be (4, 17).</p> $10 \cdot 4 - 23 = 29 - 3 \cdot 4$ $40 - 23 = 29 - 12$ $17 = 17$ <p><i>Example 2:</i> Equations having no solution have variables that will cancel out and constants that are not equal. This means that there is not a value that can be substituted for x that will make the sides equal.</p> $-x + 7 - 6x = 19 - 7x \quad \text{Combine like terms}$ $-7x + 7 = 19 - 7x \quad \text{Add } 7x \text{ to each side}$ $7 \neq 19$ <p>This solution means that no matter what value is substituted for x the final result will never be equal to each other. If each side of the equation were treated as a linear equation and graphed, the lines would be parallel.</p>

Approximate Time Frame: 3 – 4 weeks

Terms:

- | | | |
|---------------------|------------------|---------------------|
| ✓ coefficient | ✓ multiplicative | ✓ solution |
| ✓ equation | ✓ inverse | ✓ term |
| ✓ identity | ✓ null set | ✓ two-step equation |
| ✓ like terms | ✓ properties | ✓ variable |
| ✓ linear expression | ✓ reciprocal | |
| | ✓ simplify | |

Resources

MGH – McGraw Hill, Glencoe Math (2015)

ML – McDougal Littell, Pre-Algebra Book; Larson, 2005

EX – Explorations in Core Math (Holt McDougal)

MA – Massachusetts *Model Curriculum Units*—you will have to sign-up for 30 day permission

NY – Engage New York

IL – Illinois *Model Math Curriculum*

MAP – Math Assessment Project (MARS)

	<i>Suggested Topics for Lessons</i>	<i>Possible Resources</i>
Prep for 8.EE.7	Simplify variable expressions; review properties, operations	<ul style="list-style-type: none"> ➤ ML 2.1, 2.2, 2.3 <i>Properties & Operations; Distributive Property; Simplifying Variable Expressions</i> ➤ VA Properties of Operations
Prep for 8.EE.7	Model situations with equations	<ul style="list-style-type: none"> ➤ ML 2.4 <i>Variables and Equations</i> ➤ MA Pre-Lesson: Modeling Real-World & Math Situations with Equations in One Variable (pg 107) ➤ NY Lesson 1: Writing Equations Using Symbols ➤ MGH 2.3 <i>Write Two-Step Equations (page 129)</i>
Prep for 8.EE.7	Solve one-step equations w/integer coefficients w/decimal coefficients	<ul style="list-style-type: none"> ➤ ML 2.5, 2.6 <i>Solving Equations Using Addition/Subtraction, Multiplication/Division</i> ➤ ML 2.7 <i>Decimal Operations and Equations with Decimals</i>
Prep for 8.EE.7	Solve two-step equations	<ul style="list-style-type: none"> ➤ MGH 2.2 <i>Inquiry Lab Solve Two-Step Equations (page 119)</i> ➤ MGH 2.2 <i>Solve Two-Step Equations (page 121)</i> ➤ ML 3.1 <i>Solving Two-Step Equations</i> ➤ Learn Zillion Lessons: Solving Linear Equations with Integers by Using Inverse Operations ➤ Learn Zillion Lessons: Solving Linear Equations with Integers Using the Distributive Property
8.EE.C.7b	Solve equations having like terms & parentheses	<ul style="list-style-type: none"> ➤ ML 3.2 <i>Solving Equations Having Like Terms and Parentheses</i> ➤ MAP: Building and Solving Equations 1 ➤ Learn Zillion Lessons: Solve Linear Equations by Combining Like Terms
8.EE.C.7b	Solve equations with variables on both sides	<ul style="list-style-type: none"> ➤ MGH 2.4 <i>Inquiry Lab Equations with Variables on Each Side (page 141)</i> ➤ MGH 2.4 <i>Solve Equations with Variables on Each Side (page 145)</i> ➤ ML 3.3 <i>Solving Equations with Variables on Both Sides</i> ➤ VA: Solving Equations (with activities) ➤ MAP: Solving Linear Equations in One Variable ➤ EX 7-3 <i>Solving Equations with Variables on Both Sides</i>
8.EE.C.7b	Solve equations with rational coefficients	<ul style="list-style-type: none"> ➤ MGH 2.1 <i>Solve Equations w/Rational Coefficients (page 111)</i> ➤ ML 5.6, 5.7 <i>Using Multiplicative Inverses; Equations w/Rational Numbers</i> ➤ NY Lesson 4: Solving a Linear Equation ➤ EX 1-5 <i>Solving Equations with Rational Numbers</i>

<p>8.EE.C.7b</p>	<p>More multi-step equations</p> <p>SBAC Evidence—The student: 2. Solves linear equations in one variable with rational number coefficients, including equations with solutions that require expanding expressions using the distributive property.</p>	<ul style="list-style-type: none"> ➤ MGH 2.5 Solve Multi-Step Equations (page 153) ➤ MA Lesson 1: Solving Equations in One Variable ➤ EX 1-6 Solving Two-Step Equations ➤ EX 7-2 Solving Multi-Step Equations ➤ Solving equations foldable
<p>8.EE.C.7a</p>	<p>Classify solutions of a linear equation</p> <p>SBAC Evidence—The student: 1. Identifies and writes examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions.</p>	<ul style="list-style-type: none"> ➤ MGH 2.5 Solve Multi-Step Equations (page 154) ➤ NY Lesson 6: Solutions of a Linear Equation ➤ NY Lesson 7: Classifications of Solutions ➤ MA Lesson 2: How Many Solutions? ➤ CCSD Core Principles: 8.EE7a ➤ IL Lesson: Infinite and No Solution Equations, go to Lesson 2, Segments 1 & 2 ➤ Blog with lesson modeling “Solving Special Case Equations”—use as an introduction