

Core Content

Cluster Title: Reason about and solve one-variable equations and inequalities.

Standard 7: Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.

MASTERY Patterns of Reasoning

This standard deals with equations where x is the independent variable, p is the constant, and q is the dependent variable.

Conceptual:

Recognize that both sides of an equation are equal, and whatever operation is performed on one side of the equation must be done on the other side to maintain the equality.

Procedural:

Solve one-step equations using all four operations with non-negative rational numbers (i.e., whole numbers, fractions, decimals).

Write and solve equations that represent real-world mathematical problems that involve non-negative rational numbers.

Representational:

Model solutions for equations of the form $x + p = q$ and $px = q$ with manipulatives, diagrams or story contexts

Supports for Teachers

Critical Background Knowledge**Conceptual:**

Recognize that variables represent numbers.

Understand that variables can be operated upon in the same way as numbers.

Procedural:

Write an expression from a real-world mathematical problem.

Use substitution to determine if both sides of the equation are equal.

<p>Representational: Model addition, subtraction, multiplication, and division with manipulatives, diagrams or story contexts.</p>	
<p>Academic Vocabulary and Notation Balance, equation, equations of the form $x + p = q$ and $px = q$</p>	
<p>Instructional Strategies Used</p> <ol style="list-style-type: none"> 1. Relate the idea of equations to a balance scale. Using objects, have students balance an actual scale and relate this idea to a balanced equation. Start off with simple true/false equations balanced on a scale. Ask students if the scale “tilts” or is “balanced” (e.g. $8 = 10 - 3$, $6 - 3 = 10 - 7$, etc.). 2. Extend the idea of the balance scale to incorporate the idea of performing arithmetic operations on both sides of the equation to isolate the variable (i.e., $x + 5 = 8$, remove 5 from both sides of the balance, which keeps the equation balanced, so $x = 3$). 	<p>Resources Used</p> <p>UEN: Algebra applies to the real world? No way! UEN: Balance or tilt NLVM: Algebra balance scales—Algebra Grades 6-8</p> <p>Human Coordinate Plane: http://fcit.usf.edu/math/lessons/activities/HumanPT.htm</p>
<p>Assessment Tasks Used</p>	
<p>Skill-based Task:</p> <p>$4 + x = 9$ $3x = 12$ $x + 5 = 10$ $1/2x = 4/5$ $5.2 + x = 7.8$ $1/5x = 7$</p>	<p>Problem Task:</p> <p>There were some grapes on the table. Logan ate 1/6 of them. He ate 5 grapes. Write an equation to represent the situation and solve.</p> <p>Angela bought 5 shirts that each cost the same amount. She spent \$34.65. How much did she spend on each shirt? (Write and solve an equation to solve the problem.)</p> <p>Ronnie earned \$.50, giving her a total of \$3.17. Write an equation that allows you to find her beginning amount.</p>