

Core Content

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

Standard: Solve linear equations in one variable.

- 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).
- b) Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

Concepts and Skills to Master

- Identify and provide examples of equations that have one solution, infinitely many solutions or no solutions.
- Solve multistep linear equations with rational coefficients and variables on both sides.

Supports for Teachers

Critical Background Knowledge

- Solve one- and two-step equations (7.EE.4a).
- Use properties of algebra to simplify algebraic expressions.

Academic Vocabulary

solve, variable, order of operations, solution, like terms, distributive property

Suggested Instructional Strategies	Resources
<ul style="list-style-type: none"> • Build on the equations solved in seventh grade and move toward increased fluency and procedural skill in solving more complex linear equations. • Examine solutions in the context of the original equation. • Consider teaching unique solutions, no solutions, and infinitely many solutions with 8.EE.8. 	

Sample Formative Assessment Tasks

Skill-Based Task	Problem Task
<p>Solve the following equations and identify the number of solutions:</p> <ul style="list-style-type: none"> • $3(x + 7) = 10$ • $2(x - 5) = \frac{1}{2}(4x + 6)$ • $2(x + 3) = 2x + 6$ 	<p>Create equations that would result in one solution, no solutions, or infinitely many solutions. What is it about the structure of the original equation that reveals the number of solutions?</p>

Core Content

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

Standard: Analyze and solve pairs of simultaneous linear equations.

- a) Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
- b) Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.*
- c) Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.

Concepts and Skills to Master

- Identify and provide examples of systems of equations that have one solution, infinitely many solutions or no solutions.
- Solve a system of equations algebraically.
- Estimate solutions by graphing systems of equations.
- Create and utilize systems of linear equation to model real-world situations.

Supports for Teachers

Critical Background Knowledge

- Graph linear equations.
- Solve a one variable equation.
- Solve for a specified variable in an equation.

Academic Vocabulary

elimination, substitution, solution, intersection, solve, system of linear equations

Suggested Instructional Strategies	Resources
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| <ul style="list-style-type: none"> • Compare cell phone plans, bike rental rates, or repair costs using equations. • Explore cases where one solution strategy is more efficient than another. | |
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Sample Formative Assessment Tasks

<p>Skill-Based Task Solve the system of equation. $2x + 3y = 4$ $-x + 4y = -13$</p>	<p>Problem Task You have been hired by a cell phone company to create two rate plans for customers, one that benefits customers with low usage and one that benefits customers with high usage. At 500 minutes, both plans should be within \$5 of each other. Design a presentation showing two plans that will meet these requirements, including graphs and equations.</p>
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