Day 17

Lesson 3-1 Solving Two-Step Equations

Lesson Objectives
- Solve two-step equations
- Use deductive reasoning

NAEP 2005 Strand: Algebra/Geometry
Topics: Equations and Inequalities; Mathematical Reasoning
Local Standards: _____

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Key Concepts

Solving Two-Step Equations

Step 1 Use the Addition or Subtraction Property of Equality to get the term with a variable alone on one side of the equation.

Step 2 Use the Multiplication or Division Property of Equality to write an equivalent equation in which the variable has a coefficient of 1

$x - 7 = 9$
$+7 \quad +7$
$1x = 16$
$x = 16$

$\frac{3x}{3} = \frac{12}{3}$
$1x = 4$
$x = 4$

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Key Concepts

Steps for Solving a Multi-Step Equation

Step 1 Clear the equation of fractions and decimals.
Step 2 Use the Distributive Property to remove parentheses on each side.
Step 3 Combine like terms on each side.
Step 4 Undo addition or subtraction
Step 5 Undo multiplication or division.

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Solve $21 = -p + 8$ p. 41

$-8 \quad -8$

$\frac{13}{-1} = \frac{-p}{-1}$

$-13 = p$

$(-1)13 = -1p(-1)$

$-13 = p$

$3x = 15$

$-x = 7$
$x = -7$

$-x = -2$
$x = 2$

✓

$21 = -p + 8$
$21 = -(13) + 8$
$21 = 13 + 8$
$21 = 21$ ✓

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a. $7 = 2y - 3$

$7 = 2y - 3$
$+3 \quad +3$
$\frac{10}{2} = \frac{2y}{2}$
$5 = y$

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b. $\frac{x}{9} - 15 = 12$

$\frac{x}{9} - 15 = 12$
$+15 \quad +15$
$\frac{9}{1} \cdot \frac{x}{9} = 27 \cdot 9$
$x = 243$

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c. $-x + 15 = 12$

$-x + 15 = 12$
$-15 \quad -15$
$-1x = -3 \quad (-1)-1x = -3(-1)$
$x = 3$

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ex. 3 p. 42

Solve $3 - 5z = 18$ Subtraction prop.

$3 - 5z \boxed{-3} = 18 \boxed{-3}$

$-5z = 15$ simplify

$\frac{-5z}{-5} = \frac{15}{-5}$ Division prop.

$z = -3$ simplify

Quick v #3

$-9 - 4m = 3$
$+9 \quad +9$ Addition Prop

$\frac{-4m}{-4} = \frac{12}{-4}$ Simplify Division Prop.

$1m = -3$ Simplify

$m = -3$

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Solve $3a + 6 + a = 90$. p. 43

$3 \cdot 21 + 6 + 21$

$4a + 6 = 90$
$-6 \quad -6$
$\frac{4a}{4} = \frac{84}{4}$
$1a = 21$

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1. Solve each equation. p. 43

a. $3x - 4x + 6 = -2$

$-1x + 6 = -2$
$-6 \quad -6$
$\frac{-1x}{-1} = \frac{-8}{-1}$
$x = 8$

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b. $7 = 4m - 2m + 1$ p. 43

$4 \cdot 3 - 2 \cdot 3 + 1$

$7 = 2m + 1$
$-1 \quad -1$
$\frac{6}{2} = \frac{2m}{2}$
$3 = m$

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c. $-2y + 5 + 5y = 14$ p. 43

$3y + 5 = 14$
$-5 \quad -5$
$\frac{3y}{3} = \frac{9}{3}$
$y = 3$

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p. 43

d. $-3z + 8 + (-2z) = -12$

$-5z + 8 = -12$

$-8 \quad -8$

$-5z = -20$

$\frac{-5z}{-5} = \frac{-20}{-5}$

$z = 4$

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Solve $2(x - 3) = 8$

$2 \cdot x - 2 \cdot 3 = 8$

$2x - 6 = 8$

$+6 \quad +6$

$\frac{2x}{2} = \frac{14}{2}$

$x = 7$

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Solve $\frac{3x}{2} + \frac{x}{5} = 17$

multiply every term by the LCD. LCD = 10

$10 \cdot \frac{3x}{2} + 10 \cdot \frac{1x}{5} = 10 \cdot 17$

$15x + 2x = 170$

$\frac{17x}{17} = \frac{170}{17}$

$x = 10$

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p. 45

Solve each equation.

3. a. $3(k + 8) = 21$

$3 \cdot k + 3 \cdot 8 = 21$

$3k + 24 = 21$

$-24 \quad -24$

$\frac{3k}{3} = \frac{-3}{3}$

$k = -1$

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b. $15 = -3(x - 1) + 9$

$15 = -3 \cdot x - -3 \cdot 1 + 9$

$15 = -3x + 3 + 9$

$15 = -3x + 12$

$-12 \quad -12$

$\frac{3}{-3} = \frac{-3x}{-3}$

$-1 = x$

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a. $\frac{m}{4} + \frac{m}{2} = \frac{5}{8}$

$\frac{8}{1} \cdot \frac{m}{4} + \frac{8}{1} \cdot \frac{m}{2} = \frac{8 \cdot 5}{1 \quad 8}$

$2m + 4m = 5$

$\frac{6m}{6} = \frac{5}{6}$

$m = \frac{5}{6}$

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