Solving One-Step Equations

Date: 10-22-12

Objective: Today we will apply the properties of inverse operations in order to solve one-step linear equations.

Notes:

Equation: a mathematical statement that sets two expressions equal

Golden Rule of Algebra: whatever is done to one side of an equation must be done to the other to maintain equality

One-step equations can be solved by applying inverse operations

Inverse Operations: opposite operations that "undo" each other

What are examples of inverse operations?

Addition + Subtraction
Multiplication + Division
Fraction + Reciprocal

Example 1: Addition & Subtraction

$x - 2 = 5$

$+2 \quad +2$

$x = 7$

$x - 2 = 5$

$7 - 2 = 5$ ✓

Example 2: Addition & Subtraction

$n+8=4$

$-8 \quad -8$

$n=-4$

$n+8=4$

$-4+8=4$ ✓

Example 3: Multiplication & Division

$-2x=3$

$\frac{-2 \cdot x}{-2} = \frac{3}{-2}$

$1x = \frac{3}{-2}$

$x = \frac{3}{-2}$

$-2 \cdot x = 3$

$\frac{-2}{1} \cdot \frac{3}{-2} = 3$

$\frac{-6}{-2} = 3$ ✓

Example 4: Multiplication & Division

$$\frac{x}{-12}=5$$

$x \div -12 = 5$

$\cdot -12 \quad \cdot -12$

$x = 5(-12)$ $x = -60$

$x = -60$

$\frac{-60}{-12} = 5 \checkmark$

Example 5: Multiplication & Division

$-y = 15$

$-1 \cdot (-15) = 15$

$15 = 15 \checkmark$

$-1y = 15$

$\frac{-1 \cdot y}{-1} = \frac{15}{-1}$

$y = -15$

Example 6: Fraction & Reciprocal

$\frac{1}{2}x = -16$

reciprocal $= \frac{2}{1}$

$\frac{2}{1} \cdot \frac{1}{2}x = \frac{-16}{1} \cdot \frac{2}{1}$

$\frac{2}{2}x = \frac{-32}{1}$

$x = -32$

(Multiply)

$\frac{1}{2} \cdot \frac{-32}{1} = -16$

$\frac{-32}{2} = -16$ ✓

Example 7: Fraction & Reciprocal

$\frac{-5}{4}x = 55$

reciprocal $= \frac{4}{-5}$

$\frac{4}{-5} \cdot \frac{-5}{4}x = \frac{55}{1} \cdot \frac{4}{-5}$

$\frac{-20}{-20}x = \frac{220}{-5}$

$x = -44$

$\frac{-5}{4} \cdot \frac{-44}{1} = 55$

$\frac{55}{1} = 55$ ✓

Exit Ticket

Solve for the unknown.

① $x - 4 = -16$

② $6x = -4$

Check work!