Name _____   Date _____

Mr. Tallman

Lesson #59: Solving Equations with Variables on Both Sides Part Two

Recall: A **rational number** is a number that can be written as a fraction or a terminating or repeating decimal.

Example 1) Solve the following equation: $\frac{1}{3}r - 3 = -6$

We can also solve equations involving rational numbers when there are variables on both sides of the equal sign. The steps are **exactly the same** as when solving equations with variables on both sides with integers.

Ex 2) $0.8x + 3.2 - 4.3x = 7.7 - x$	Ex 3) $2.6(x - 0.8) = 8.72 - x$
Ex 4) $2x - 1 = \frac{3}{4}x + 9$	Ex 5) $\frac{1}{5}x - 4 = 2 - \frac{2}{5}x$

Now, You Try! Solve each equation.

1) $\frac{1}{2} + w = 8 - \frac{3}{2}w$

2) $\frac{3}{4}y - 6 = \frac{1}{8}y + 4$

3) $0.2(3y - 5) = 0.15(2y + 3) - 0.85$

4) $\frac{1}{2}\left(x + \frac{2}{3}\right) = 3(x - 1)$

5) $\frac{1}{2}(2h - 1) = \frac{1}{3}\left(2h - \frac{1}{2}\right)$

6) $\frac{1}{8}(3y + 2) = \frac{1}{4}\left(2y + \frac{1}{2}\right) + \frac{1}{2}$

Solve the Following Equations.

$7x - 3 = 5x + 5$	$7x - 3 = 7x + 5$	$7x - 3 = -3 + 7x$

Types of Solutions to a Linear Equation:

Number of Solutions	How We Know	Examples
One (Unique) Solution	Different coefficient (number attached to the variable) on both sides of the equal sign.	
Infinite Solutions	Same coefficient, same constant on each side of the equal sign.	
No Solutions	Same coefficient, different constant on each side of the equal sign.	

Determine the number of solutions. (One Solution, Infinite Solutions, No Solution)

1) $11x - 2x + 15 = 8 + 7 + 9x$

2) $3(x - 14) + 2 = 3x + 5$

3) $6x - 2x - 6 = 5x + 6$

4) $6x + 10 = 2(3x + 5)$