Solving Linear Equations with the Variable on Both Sides of the Equation

This section uses the same tools as the previous section. If you look at the steps, they are the same except for step 4.

Steps to solving:
1) If fractions are present, multiply both sides of the equation by the LCD (least common denominator). After you are done multiplying by the LCD the equation will no longer have fractions.
2) Use the distributive property to remove parentheses.
3) Combine like terms that are on the SAME side of the equal sign.
4) Use the Addition Property to move all variable terms to the one side of the equation and all constant terms (numbers) to the other side of the equation. In this step you are adding or subtracting both sides of the equation by the same amount to move the term from one side of the equation to the other. It does not matter what side of the equal sign you bring the variables to and which one you bring the constants to. In your mind, make one side the ‘variable side’ and the other one the ‘constant side’. By the time you are done with this step, the equation will either look like ax=b or the variables will cancel out*.
   *If the variables cancel out, look at what you are left with:
   a. If the statement is TRUE, then ALL REAL NUMBERS are solutions to equation.
   b. If the statement is FALSE, then there is NO SOLUTION to the equation.
5) Use the Multiplication Property to isolate the variable; that is, to get it to look like $x = \#$ or $\# = x$. This is done by dividing both sides of the equation by the coefficient.
6) If you do get a value, check it by plugging it into the original equation. If you get the same value on both sides of the equal sign, the value you found is the solution to the equation. If you get different values, then the value you found is not a solution...look over your work.

Examples: Solve.
1) \(-4m - 5 = 2m + 7\) 2) \(21 + 2m = -2(m + 3) + 9\)

3) \(2.5x - 4.25 = 3x + 2.8\) 4) \(\frac{1}{2}(2x + 4) = \frac{1}{3}(4x - 4)\)
5) \( \frac{w - 7}{3} = \frac{w + 5}{2} - \frac{7w - 1}{6} \)

6) \( 8 + 2x = 3 + 2x + 5 \)

7) \( 5 + 3x - 1 = 7x - 2 - 4x + 9 \)

8) \( 8 - 3x = 4x + 50 \)

9) \( -4 + 2y = 2y - 6 + y \)

10) \( \frac{5}{2} - \frac{x}{3} = 3x \)

11) \( 4(x - 3) + 2 = 2x + 8 \)

12) \( 3(y - 1) + 9 = 8y + 6 - 5y \)

13) \( \frac{1}{5}(30 - 10x) = \frac{2}{3}(4x + 2) \)

14) \( 6(m - 1) + 5 = 3(2m - 4) \)