

Solving Equations with Variables on Both Sides

 Guided Notes

An equation with variable on both sides means the variable is on both sides of the equality.

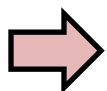
Mathematically, it is of the form:

$$ax \pm b = cx \pm d$$

Equations with One Solution

In this case, exactly one solution exists for the equation.

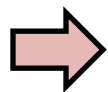
Problem 1: Solve $5x - 2 = 2x - 14$.



$$5x - 2x - 2 = 2x - 2x - 14$$

Subtraction Property of Equality

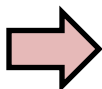
$$3x - 2 = -14$$



$$3x - 2 + 2 = -14 + 2$$

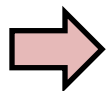
Addition Property of Equality

$$3x = -12$$



$$\frac{3x}{3} = \frac{-12}{3}$$

Division Property of Equality



$$x = -4$$

Identity Equation

An identity equation is an equation that is true for every value of the variable.

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Problem 2: Solve $5(2x - 2) = 2(5x - 5)$.



$$10x - 10 = 10x - 10$$

Distributive Property



$$10x - 10 + 10 = 10x - 10 + 10$$

Addition Property of Equality

$$10x = 10x$$

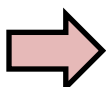
Identity

This equation is an identity equation since all the values of x are the solutions to this equation.

Equation with No Solution

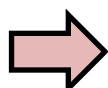
An equation in which the variable on both sides gets cancelled out but the remaining sides are not equal is an equation with no solution.

Problem 3: Solve $9x - 4 = -3x + 5 + 12x$.



$$9x - 4 = 9x + 5$$

Combining Like Terms



$$9x - 4 - 9x = 9x + 5 - 9x$$

Subtraction Property of Equality

$$-4 = 5$$

No Solution