

Solving Two-Step Equations Guided Notes

A **Two-Step Equation** is an equation that can be solved in two steps using the properties of equality and undoing the mathematical operations.

If x is the variable in the equation, then the two-step equation can be of the forms:

$$ax + b = c$$

$$ax - b = c$$

$$\frac{x}{a} + b = c$$

$$\frac{x}{a} - b = c$$

$$a(x + b) = c$$

$$a(x - b) = c$$

$$\frac{x + a}{b} = c$$

$$\frac{x - a}{b} = c$$

Undoing the Order of Operations

While simplifying the mathematical expressions, the order of operations followed is PEDMAS.

When Simplifying	Name	Operation	When Solving Equation
 DO	()	Parenthesis	 UNDO
	x^2	Exponents	
	$\div \times$	Divide, Multiply	
	$+ -$	Add, Subtract	

When solving an equation, we undo the operations in equation in the opposite sequence i.e. from bottom to top.

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Solving Two-Step Equations without Parenthesis

In solving these types of equations, we first add or subtract and then multiply or divide according to the equation.

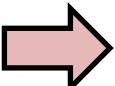
$$ax + b = c$$

$$ax - b = c$$

$$\frac{x}{a} + b = c$$

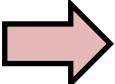
$$\frac{x}{a} - b = c$$

Problem 1: Solve $2x - 4 = 8$.

Step 1  $2x - 4 + 4 = 8 + 4$ **Addition Property of Equality**

$$2x = 12$$

Step 2  $\frac{2x}{2} = \frac{12}{2}$ **Division Property of Equality**

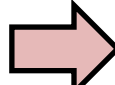
 $x = 6$

Problem 2: Solve $\frac{x}{4} + 3 = 5$.

Step 1  $\frac{x}{4} + 3 - 3 = 5 - 3$ **Subtraction Property of Equality**

$$\frac{x}{4} = 2$$

Step 2  $4 \times \frac{x}{4} = 2 \times 4$ **Multiplication Property of Equality**

 $x = 8$

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Solving Two-Step Equations with Parenthesis

In solving these types of equations, we first multiply or divide and then solve the expression in parenthesis using addition or subtraction, according to the equation.

$$a(x + b) = c$$

$$a(x - b) = c$$

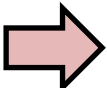
$$\frac{x + a}{b} = c$$

$$\frac{x - a}{b} = c$$

Problem 3: Solve $5(x - 1) = 15$.

Step 1  $\frac{5(x - 1)}{5} = \frac{15}{5}$ Division Property of Equality

$$x - 1 = 3$$

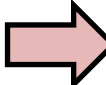
Step 2  $x - 1 + 1 = 3 + 1$ Addition Property of Equality

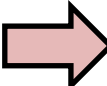
 $x = 4$

Problem 4: Solve $\frac{x+10}{6} = 5$.

Step 1  $6 \times \frac{x + 10}{6} = 5 \times 6$ Multiplication Property of Equality

$$x + 10 = 30$$

Step 2  $x + 10 - 10 = 30 - 10$ Subtraction Property of Equality

 $x = 20$