



PreAlgebraCoach.com

Solving Two-Step Equations

Unit 7 Lesson 1

SOLVING TWO-STEP EQUATIONS

Students will be able to:

Solve two-step equations by undoing mathematical operations

Key Vocabulary:

- Two-Step equation
- Order of Operations

SOLVING TWO-STEP EQUATIONS

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:

$$ax + b = c$$

$$ax - b = c$$

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

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

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

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

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

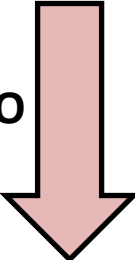
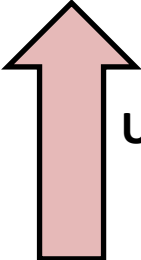
$$\frac{x - a}{b} = c$$



SOLVING TWO-STEP EQUATIONS

Undoing the Order of Operations

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

| | Name | Operation | |
|---|---------------|------------------|--|
| When Simplifying DO  | () | Parenthesis | When Solving Equation 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.

SOLVING TWO-STEP EQUATIONS

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.

$$ax + b = c$$

$$ax - b = c$$

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

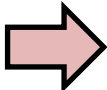
$$\frac{x}{a} - b = c$$

SOLVING TWO-STEP EQUATIONS

Problem 1: Solve $2x - 6 = 8$.

SOLVING TWO-STEP EQUATIONS

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Step 1  $2x - 6 + 6 = 8 + 6$ Addition Property of Equality

$$2x = 14$$

Step 2  $\frac{2x}{2} = \frac{14}{2}$ Division Property of Equality

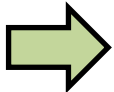
 $x = 7$

SOLVING TWO-STEP EQUATIONS

Problem 2: Solve $\frac{x}{4} + 3 = 9$.

SOLVING TWO-STEP EQUATIONS

Problem 2: Solve $\frac{x}{4} + 3 = 9$.

Step 1 

$$\frac{x}{4} + 3 - 3 = 9 - 3$$

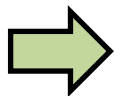
Subtraction Property of Equality

$$\frac{x}{4} = 6$$

Step 2 

$$4 \times \frac{x}{4} = 6 \times 4$$

Multiplication Property of Equality



$$x = 24$$

SOLVING TWO-STEP EQUATIONS

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.

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

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

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

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

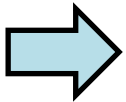
SOLVING TWO-STEP EQUATIONS

Problem 3: Solve $5(x - 1) = 30$.

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Step 1

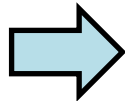


$$\frac{5(x - 1)}{5} = \frac{30}{5}$$

Division Property of Equality

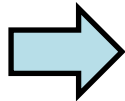
$$x - 1 = 6$$

Step 2



$$x - 1 + 1 = 6 + 1$$

Addition Property of Equality



$$x = 7$$

SOLVING TWO-STEP EQUATIONS

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

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

Step 1

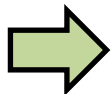


$$4 \times \frac{x+10}{4} = 5 \times 4$$

Multiplication Property of Equality

$$x + 10 = 20$$

Step 2



$$x + 10 - 10 = 20 - 10$$

Subtraction Property of Equality



$$x = 10$$

