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Solving Multi-Step Equations

Unit 2 Lesson 3

SOLVING MULTI-STEP EQUATIONS

Students will be able to:

Solve multi-step equations by combining like terms and using distributive property

Key Vocabulary:

- Multi-Step equation
- Combining Like Terms
- Distributive Property

SOLVING MULTI-STEP EQUATIONS

A **Multi-Step Equation** is an equation that can be solved in more than two steps by combining like terms and distributive property.

There are two types of problems involving multi-step equations and are solved by:

- **Combining Like Terms (CLT)**
- **Distributive property and CLT**

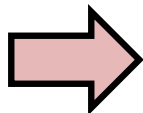
SOLVING MULTI-STEP EQUATIONS

Solving Multi-Step Equations by Combining Like Terms

In solving these types of equations, we first combine the like terms i.e. the terms with the variable. After this, the equation is solved by applying the properties of equality.

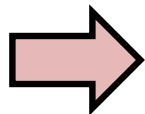
Example 1: Solve $5x - 2x + 2 = 8$.

$$5x - 2x + 2 = 8$$



$$3x + 2 = 8$$

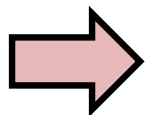
Combining Like Terms



$$3x + 2 - 2 = 8 - 2$$

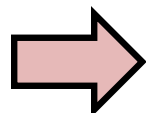
Subtraction Property of Equality

$$3x = 6$$



$$\frac{3x}{3} = \frac{6}{3}$$

Division Property of Equality



$$x = 2$$

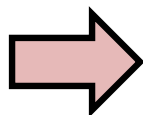


SOLVING MULTI-STEP EQUATIONS

Solving Multi-Step Equations by Combining Like Terms

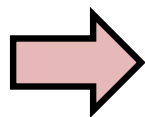
Example 2: Solve $\frac{x}{4} + x + 11 = 6$.

$$\frac{x}{4} + x + 11 = 6$$



$$\frac{5x}{4} + 11 = 6$$

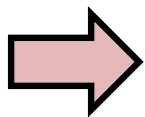
Combining Like Terms



$$\frac{5x}{4} + 11 - 11 = 6 - 11$$

Subtraction Property of Equality

$$\frac{5x}{4} = -5$$



$$\frac{4}{5} \times \frac{5x}{4} = -5 \times \frac{4}{5}$$

Multiplication Property of Equality

$$x = -4$$

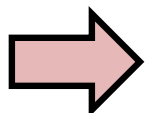
SOLVING MULTI-STEP EQUATIONS

Solving Multi-Step Equations using Distributive property

In solving these types of equations, we first apply distributive property on the terms in parenthesis. After that we combine like terms and solve the equation for the variable.

$$A(B \pm C) = AB \pm AC \quad \text{Distributive Property}$$

Example 3: Solve $3x + 5(x - 1) = 11$.


$$3x + 5x - 5 = 11 \quad \text{Distributive Property}$$


$$8x - 5 = 11 \quad \text{Combining Like Terms}$$


$$8x - 5 + 5 = 11 + 5 \quad \text{Addition Property of Equality}$$

$$8x = 16$$


$$\frac{8x}{2} = \frac{16}{2} \quad \text{Multiplication Property of Equality}$$

$$x = 2$$