



Math 10 Lecture Videos

Section 2.1:

Addition Property of Equality

PAUL ANDREW GORGONIO

OBJECTIVES:



1. Identify linear equations in one variable
2. Use the addition property of equality to solve equations.
3. Solve applied problem using formulas.

Objective 1: Identify linear equations with one variable



Linear Equation in One Variable

- Equation that can be written in the form **$ax + b = c$**
 - a , b , and c are real numbers
 - $a \neq 0$ (a is not equal to 0)

Examples

1. $3x + 7 = 9$ Equation is in the form $ax + b = c$; $a = 3$, $b = 7$, and $c = 9$
2. $x = 6.8$ Equation is in the form $ax + b = c$; $a = 1$, $b = 0$, and $c = 6.8$

Objective 2: Use the Addition Property of Equality to Solve Questions



Addition Property of Equality

The same real number (or algebraic expression) may be added to both sides of an equation without changing the equation's solution.

$$a = b$$

$$a + c = b + c$$

Objective 2: Use the Addition Property of Equality to Solve Equations



Example 1: Solve $x - 9 = 12$

We can isolate the variable x by adding 9 to both sides.

$$\begin{aligned}x - 9 &= 12 \\x - 9 + 9 &= 12 + 9 \\x &= 21\end{aligned}$$

Note: Solving an equation is the process of finding the number (or numbers) that make the equation a true statement. These numbers are called the solutions or roots or the equation

Objective 2: Use the Addition Property of Equality to Solve Equations



Example 2: Solve $x + 6 = 9$

We can isolate the variable x by subtracting 6 from both sides.

$$x + 6 = 9$$

$$x + 6 - 6 = 9 - 6$$

$$x = 3$$

Objective 2: Use the Addition Property of Equality to Solve Equations



Adding and Subtracting Variable Terms

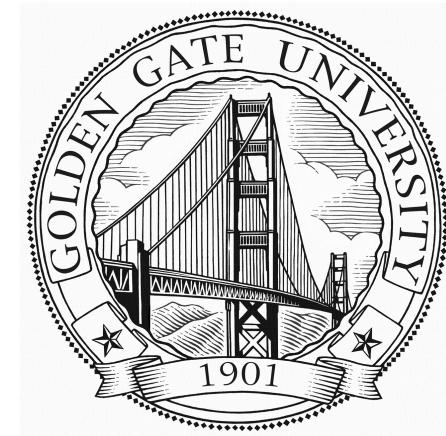
Example 3: $5x = 4x + 3$

$$5x = 4x + 3$$

$$5x - 4x = 4x + 3 - 4x$$

$$x = 3$$

Objective 2: Use the Addition Property of Equality to Solve Equations



Example 4: Solve $5 + 3x - 4x = 1 - 2x + 12$

$$5 + 3x - 4x = 1 - 2x + 12$$

$$5 - x = 13 - 2x$$

$$5 - x + 2x = 13 - 2x + 2x$$

$$5 + 1x = 13$$

$$5 - 5 + 1x = 13 - 5$$

$$x = 8$$

Add $2x$ to both sides

Simplify

Subtract 5 from
both sides

Simplify

Objective 2: Use the Addition Property of Equality to Solve Equations



Example 4: Check when $x = 8$

$$5 + 3x - 4x = 1 - 2x + 12 \quad \text{Original euqation}$$

$$5 + 3(8) - 4(8) \stackrel{?}{=} 1 - 2(8) + 12 \quad \text{Replace } x \text{ with } 8$$

$$5 + 24 - 32 \stackrel{?}{=} 1 - 16 + 12 \quad \text{Multiply}$$

$$29 - 32 \stackrel{?}{=} -16 + 13 \quad \text{Add or subtract from left to right}$$

$-3 = -3$ True - It checks. The solution set is $\{8\}$.

Objective 2: Use the Addition Property of Equality to Solve Equations



Example 5:

$$\begin{aligned} -\frac{1}{2} &= x - \frac{3}{4} & \longrightarrow & \quad -\frac{1}{2} = x - \frac{3}{4} \\ -\frac{1}{2} + \frac{3}{4} &= x - \frac{3}{4} + \frac{3}{4} \\ -\frac{2}{4} + \frac{3}{4} &= x \\ \frac{1}{4} &= x \end{aligned}$$

Objective 2: Use the Addition Property of Equality to Solve Equations



Example 6: Solve and Check $3x - 6 = 2x + 5$

$$3x - 6 = 2x + 5$$

$$3x - 2x - 6 = 2x - 2x + 5$$

$$x - 6 = 5$$

$$x - 6 + 6 = 5 + 6$$

$$x = 11$$

$$\begin{aligned}3x - 6 &= 2x + 5 \\33 - 6 &= 22 + 5 \\27 &= 27, \text{ true}\end{aligned}$$

Objective 3: Solve applied problems using formula



There is a relationship between the number of words in a child's vocabulary, V and the child's age, A , in months, for ages between 15 and 50 months, inclusive. This relationship can be modeled by the formula $V + 900 = 60A$. Find the number of words in a child's vocabulary at the age of 50 months.

$$V + 900 = 60A$$

$$V + 900 = 60(50)$$

$$V + 900 = 3000$$

$$V + 900 - 900 = 3000 - 900$$

$$V = 2100$$

At 50 months, a child will have a vocabulary of 2100 words.

OBJECTIVES:



1. Identify linear equations in one variable ✓
2. Use the addition property of equality to solve questions. ✓
3. Solve applied problems using formulas. ✓