Math 10 Lecture Videos

Section 2.1:
Addition Property of Equality

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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.

$$x - 9 = 12$$
$$x - 9 + 9 = 12 + 9$$
$$x = 21$$

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

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

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

$$5-x+2x=13-2x+2x \quad \text{Add } 2x \text{ to both sides}$$

$$5+1x=13 \quad \text{Simplify}$$

$$5-5+1x=13-5 \quad \text{Substract 5 from both sides}$$

$$x=8 \quad \text{Simplify}$$

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

Example 4: Check when x =8

$5+3x-4x=1-2x+12$	Original euqation
$5+3(8)-4(8)\stackrel{?}{=}1-2(8)+12$	Replace x with 8
$5+24-32\stackrel{?}{=}1-16+12$	Multiply
$29-32\stackrel{?}{=}-16+13$	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: $-\frac{1}{2} = x - \frac{3}{4}$ $\longrightarrow$

$$-\frac{1}{2} = x - \frac{3}{4}$$

$$-\frac{1}{2} + \frac{3}{4} = x - \frac{3}{4} + \frac{3}{4}$$

$$-\frac{2}{4} + \frac{3}{4} = x$$

$$\frac{1}{4} = x$$

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

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

$$3x - 6 = 2x + 5$$
$$3x - 2x - 6 = 2x - 2x + 5$$
$$x - 6 = 5$$
$$x - 6 + 6 = 5 + 6$$
$$x = 11$$

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

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.

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1. Identify linear equations in one variable ✓
2. Use the addition property of equality to solve questions. ✓
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