

TOPIC: THE ADDITION AND SUBTRACTION PROPERTIES OF EQUALITY

Introduction to Linear Equations

◆ Recall: An **equation** is a statement that two algebraic **expressions** are equal.

New

Linear Equations in One Variable

expression

$2x + 6$

expression

0

$ax + b = c$

a, b, c are _____ numbers

a _____ 0

◆ The **solution** to an equation is the value of the variable that makes the statement _____ when plugged in.

EXAMPLE

Determine whether the given value is a solution to the equation.

(A)

$$2x + 6 = 0; x = -3$$

(B)

$$5 = 8w - 3; w = -1$$

◆ For a linear equation, write the **solution set** by putting the solution in set brackets { }.

TOPIC: THE ADDITION AND SUBTRACTION PROPERTIES OF EQUALITY

EXAMPLE

Determine whether each of the following is a linear equation in one variable.

(A) $4x - 7 + 3$

(B) $5y - y = 2$

(C) $6x + 1 = 2t^2$

PRACTICE

Identify the following as either an expression or equation.

(A) $\frac{2m}{3} + 8$

[EXPRESSION | EQUATION]

(B) $4(a - 2) = 21$

[EXPRESSION | EQUATION]

PRACTICE

Which of the following is a linear equation in one variable?

A. $x + 5 = 12$

B. $x^2 = 25$

C. $y + z = 10$

D. $x - 3 < 7$

TOPIC: THE ADDITION AND SUBTRACTION PROPERTIES OF EQUALITY

PRACTICE

Which of the following is a linear equation in one variable?

A. $2(x + 5) - 3x = x^2 + 1$

B. $x(x + 4) = 0$

C. $4(x + 3) = 2x + 18$

D. $x^2 + 5x = 10$

PRACTICE

Verify that the given value is a solution to the equation.

(A) $y = -2; 5y + 4 = 14$

[SOLUTION | NOT A SOLUTION]

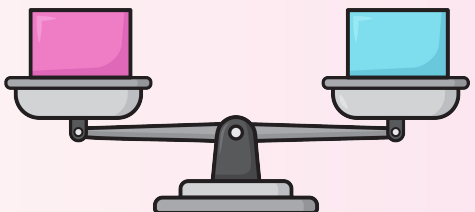
(B) $a = 2; 4a + 3 = a + 9$

[SOLUTION | NOT A SOLUTION]

TOPIC: THE ADDITION AND SUBTRACTION PROPERTIES OF EQUALITY

Addition and Subtraction Properties of Equality

- ◆ To **solve** an equation, _____ the variable using operations like **addition** and **subtraction**.
- ▶ Operations must **ALWAYS** be done to _____ sides of an equation to create *equivalent equations*.

Addition Property of Equality		Subtraction Property of Equality
If $a = b$, then a ____ = b ____ Use when eqn has [ADDITION SUBTRACTION] $x - 6 = 0$ $x - 6 \text{ ____} = 0 \text{ ____}$ $\text{____} = \text{____}$		If $a = b$, then a ____ = b ____ Use when eqn has [ADDITION SUBTRACTION] $0 = x + 2$ $0 \text{ ____} = x + 2 \text{ ____}$ $\text{____} = \text{____}$

- ◆ Check your solution by replacing variable in original equation & verifying that it makes the statement **true**.

EXAMPLE

Solve the linear equation, then check your solution.

$$y - 1.2 = 5.8$$

TOPIC: THE ADDITION AND SUBTRACTION PROPERTIES OF EQUALITY

PRACTICE

Solve the given linear equation using addition and subtraction properties of equality.

(A)

$$x + \frac{2}{8} = -\frac{3}{8}$$

(B)

$$-5.4 + c = 1.6$$

PRACTICE

Solve the given linear equation using addition and subtraction properties of equality.

(A)

$$6h - (-12) = 5 + 5h$$

(B)

$$2(x + 5) = 3(x - 1)$$

(C)

$$3(y + 3) + (1 - y) = 3y + 14$$

EXAMPLE

Translate the following statement into a linear equation and solve.

A number decreased by 7 is equal to 15. What is the number?