

TOPIC: INTRODUCTION TO SOLVING EQUATIONS

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)

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

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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

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

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

[SOLUTION | NOT A SOLUTION]

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

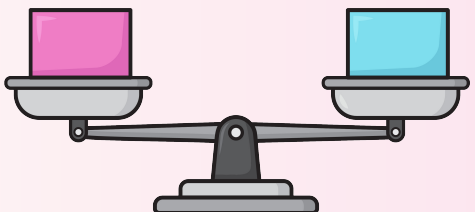
[SOLUTION | NOT A SOLUTION]

TOPIC: INTRODUCTION TO SOLVING EQUATIONS

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] $x - 6 = 0$ $x - 6$ _____ = 0 _____ _____ = _____	If $a = b$, then a _____ = b _____ Use when eqn has [ADDITION SUBTRACTION] $0 = x + 2$ 0 _____ = $x + 2$ _____ _____ = _____



- ◆ 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.

$$c + 5 = 19$$

PRACTICE

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

(A) $m - 9 = -6$

(B) $x - (-5) = 12$

PRACTICE

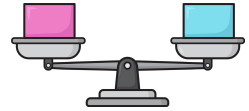
Solve the equation, then check the solution.

$$30 - 10 + 4 = x$$

TOPIC: INTRODUCTION TO SOLVING EQUATIONS

Multiplication and Division Properties of Equality

◆ Recall: Solve a linear equation by using operations done to **both** sides to isolate the variable.



► **Multiplication** and **division** can also be used to create *equivalent equations*.

Multiplication Property of Equality	Division Property of Equality
If $a = b$, then $a \underline{\hspace{1cm}} = b \underline{\hspace{1cm}}$ Use when eqn has [MULTIPLICATION DIVISION] $\frac{x}{2} = 9$ $\frac{x}{2} \underline{\hspace{1cm}} = 9 \underline{\hspace{1cm}}$ $\underline{\hspace{1cm}} = \underline{\hspace{1cm}}$	If $a = b$, then $a = b$ Use when eqn has [MULTIPLICATION DIVISION] $20 = 5x$ $20 = 5x$ $\underline{\hspace{1cm}} = \underline{\hspace{1cm}}$

PRACTICE

Solve the given linear equation, then check your answer.

(A) $60 = -5p$

(B) $\frac{t}{9} = 4$

(C) $-x = 64$

(D) $3z = 0$