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 *expression*

$2x + 6$ 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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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]

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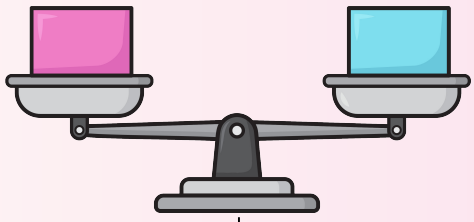
Addition and Subtraction Properties of Equality

◆ 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 _____ $= b$ _____	If $a = b$, then a _____ $= b$ _____
Use when eqn has **[ADDITION | SUBTRACTION]**	*Use when eqn has* **[ADDITION | SUBTRACTION]**
$x - 6 = 0$ $x - 6$ _____ $= 0$ _____ _____ $=$ _____	$0 = x + 2$ 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*) $m - 9 = -6$

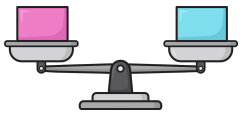
(*B*) $x - (-5) = 12$

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 _____ $= b$ _____	If $a = b$, then $a = b$
Use when eqn has **[MULTIPLICATION | DIVISION]**	*Use when eqn has* **[MULTIPLICATION | DIVISION]**
$\frac{x}{2} = 9$	$20 = 5x$
$\frac{x}{2}$ _____ $= 9$ _____	$20 = 5x$
_____ $=$ _____	_____ $=$ _____

PRACTICE Solve the given linear equation, then check your answer.

(A) $60 = -5p$

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

(C) $-x = 64$

(D) $3z = 0$