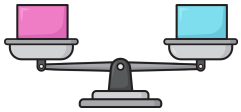
TOPIC: THE MULTIPLICATION AND DIVISION PROPERTIES OF EQUALITY

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]**
$\frac{x}{2} = 9$	$20 = 5x$
$\frac{x}{2}$ _____ $= 9$ _____	$20 = 5x$
_____ $=$ _____	_____ $=$ _____

◆ Isolate the variable *term* using _____ BEFORE using $\times / \div$ to fully isolate *variable*.

EXAMPLE Solve the linear equation, then check your solution.

$3a - 4 = 11$

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EXAMPLE Solve the linear equation, then check your solution.

$1.2a + 2.3 = 5.9$

PRACTICE Solve the given linear equation using multiplication and division properties of equality.

$(\boldsymbol{A})$

$-8x = 64$

$(\boldsymbol{B})$

$\frac{y}{4} = -\frac{21}{6}$

$(\boldsymbol{C})$

$\frac{126}{14} = 3y$

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

$(\boldsymbol{A})$

$-(h + 3) = 11$

$(\boldsymbol{B})$

$0.5t + 1.5t = 7 + 3 - 4$

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EXAMPLE Translate the following statement into a linear equation and solve.

Three times L equals 54. What is the value of L?

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Multiplication Property for Fraction Coefficients

◆ If the variable in a linear equation has a fraction **coefficient**, cancel by multiplying both sides by its _____.

► Recall: The product of a **number** and its **reciprocal** is 1. For example, $\frac{2}{3} \cdot \frac{3}{2} = 1$

EXAMPLE Solve the following equations.

Recall
If $a = b$,
then $ac = bc$

(A)

$$\frac{3}{4}x = 9$$

(B)

$$10 = \frac{5}{3}y$$

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PRACTICE Solve the given linear equation.

$(\boldsymbol{A})$

$$\frac{2}{3}x = 10$$

$(\boldsymbol{B})$

$$-6 = \frac{3}{5}t$$

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

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

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TOPIC RESOURCE: PROPERTIES OF EQUALITY

Name	Use when equation has…	Property of Equality If $a = b$, then…	Example
Addition	–	$a + c = b + c$	$x - 6 = 0$ $x - 6 + 6 = 0 + 6$ $x = 6$
Subtraction	+	$a - c = b - c$	$0 = x + 2$ $0 - 2 = x + 2 - 2$ $-2 = x$
Multiplication	÷	$ac = bc$	$\frac{x}{2} = 24$ $2 \cdot \frac{x}{2} = 24 \cdot 2$ $x = 48$ $\frac{3}{4}x = 9$ $\frac{4}{3} \cdot \frac{3}{4}x = 9 \cdot \frac{4}{3}$ $x = 12$
Division	×	$\frac{a}{c} = \frac{b}{c}$	$20 = 5x$ $\frac{20}{5} = \frac{5x}{5}$ $4 = x$