Algebra

Goal: Rewrite literal equations and formulas.

## Vocabulary

Literal equation $\square$

## Example 1 Solving a Literal Equation

Solve $a x-b x=c$ for $x$. Then use the solution to solve $5 x-2 x=12$.

## Solution

1. Solve $a x-b x=c$ for $x$.


Write original equation.

2. Use the solution to solve $5 x-2 x=12$.


Answer: The solution of $5 x-2 x=12$ is $\square$

Checkpoint Solve the literal equation for $x$. Then use the solution to solve the specific equation.

1. $\frac{x}{a}-b=c ; \frac{x}{4}-1=3$
2. $a x=c-b x ; 5 x=9-4 x$

Solve $3 y-6 x=12$ for $y$.

## Solution

$3 y-6 x=12$
$\square$ $=\square$

$\square$

Write original equation.
Add $\square$ to each side.

Multiply each side by

$\square$ and simplify.

## Checkpoint Solve the equation for $y$.

3. $2 y+8=14 x$
4. $18=6 x+9 y$

## Example 3 Rewriting and Using a Geometric Formula

The area $A$ of a rectangle is given by the formula $A=I w$ where $I$ is the length and $w$ is the width.
a. Solve the formula for the width $w$.
b. Use the rewritten formula to find the width of the rectangle shown.

$I=40 \mathrm{ft}$

## Solution

a. $A=l w \quad$ Original formula.
$w=\frac{\square}{\square}$ $\square$
b. Substitute $\square$ for $\square$ and $\square$ for $\square$ in the rewritten formula.


Write rewritten formula.

Substitute $\square$ for $\square$ and $\square$ for $\square$.

$$
=\square
$$

Simplify.
Answer: The width is $\square$

# Solving Inequalities Using Addition or Subtraction 

Goal: Solve inequalities using addition or subtraction.

## Vocabulary

Inequality:

Solution of an inequality:

Equivalent inequalities:

## Example 1 Writing and Graphing an Inequality

Air Travel An airline allows passengers to carry on-board one piece of luggage. Luggage that exceeds 40 pounds cannot be carried on-board. Write an inequality that gives the weight of luggage that cannot be carried on-board.

## Solution

Let $w$ represent the weight of the luggage. Because the weight cannot exceed 40 pounds, the weight of luggage that cannot be carried on-board must be $\square$.

Answer: The inequality is $\square$. Draw the graph below.


The addition and subtraction properties of inequality are also true for inequalities involving $\leq$ and $\geq$.

## Addition and Subtraction Properties of Inequality

Words Adding or subtracting the same number on each side of an inequality produces an equivalent inequality.

Algebra If $a<b$, then $a+c<b+c$ and $a-c<b-c$.
If $a>b$, then $a+c>b+c$ and $a-c>b-c$.

## Example 2 Solving an Inequality Using Subtraction

Solve $m+9 \leq 12$. Graph and check your solution.

$$
m+9 \leq 12 \quad \text { Write original inequality. }
$$


$m \leq \square$
Simplify.
Answer: The solution is $m \leq$ $\square$ Draw the graph below.


Check: Choose any number less than or equal to $\square$ . Substitute the number into the original inequality.
$m+9 \leq 12$
$\square+9!12$


Write original inequality.
Substitute 0 for $m$.
$\square$

Example 3 Solving an Inequality Using Addition
Solve -7<x-11. Graph your solution.

$$
-7<x-11 \quad \text { Write original inequality. }
$$

$$
-7+\square<x-11+\square
$$

$$
\square<x
$$

Add $\square$
Simplify.
Answer: The solution is $\square<x$, or $\square$. Draw the graph below.


1. $m+7<13$

2. $a+4 \geq 5$

3. $x-2 \leq 3$

4. $-6<z-7$

