LESSON 3.1

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Practice with Examples

For use with pages 132–137

GOAL **Solve linear equations using addition and subtraction and use linear equations to solve real-life problems**

VOCABULARY

Equivalent equations have the same solutions.

Inverse operations are two operations that undo each other, such as addition and subtraction.

Each time you apply a transformation to an equation, you are writing a **solution step.**

In a **linear equation,** the variable is raised to the *first* power and does not occur inside a square root symbol, an absolute value symbol, or in a denominator.

EXAMPLE 1 Adding to Each Side

Solve $y - 7 = -2$.

SOLUTION

To isolate y, you need to undo the subtraction by applying the inverse operation of adding 7.

$y - 7 = -2$	Write original equation.
$y - 7 + 7 = -2 + 7$	Add 7 to each side.
$y = 5$	Simplify.

The solution is 5. Check by substituting 5 for y in the original equation.

Exercises for Example 1

Solve the equation.

1. $t - 11 = 4$

2. $x - 2 = -3$

3. $5 = d - 8$

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EXAMPLE 2 Subtracting from Each Side

Solve $q + 4 = -9$.

SOLUTION

To isolate q, you need to undo the addition by applying the inverse operation of subtracting 4.

$q + 4 = -9$	Write original equation.
$q + 4 - 4 = -9 - 4$	Subtract 4 from each side.
$q = -13$	Simplify.

The solution is -13. Check by substituting -13 for q in the original equation.

Exercises for Example 2

Solve the equation.

4. $s + 1 = -8$ **5.** $-6 + b = 10$ **6.** $6 = w + 12$

EXAMPLE 3 Simplifying First

Solve $x - (-3) = 10$.

SOLUTION

$x - (-3) = 10$	Write original equation.
$x + 3 = 10$	Simplify.
$x + 3 - 3 = 10 - 3$	Subtract 3 from each side.
$x = 7$	Simplify.

The solution is 7. Check by substituting 7 for x in the original equation.

Exercises for Example 3

Solve the equation.

7. $8 + z = 1$ **8.** $7 = k - 2$ **9.** $9 = a + (-5)$

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EXAMPLE 4 Modeling a Real-Life Problem

The original price of a bicycle was marked down $20 to a sale price of $85. What was the original price?

SOLUTION

Original price (p) − Price reduction (20) = Sale Price(85)

Solve the equation $p - 20 = 85$.

$p - 20 = 85$ Write real-life equation.

$p - 20 + 20 = 85 + 20$ Add 20 to each side.

$p = 105$ Simplify.

The original price was $105. Check this in the statement of the problem.

Exercise for Example 4

10. After a sale, the price of a stereo was marked up $35 to a regular price of $310. What was the sale price?