

# 3-4 Solving Multi-Step Equations (Pages 142–148)

**Solving Multi-Step Equations**

- Work backward to isolate the variable and solve the equation.
- Use subtraction to undo addition, and use addition to undo subtraction.
- Use multiplication to undo division, and use division to undo multiplication.

**Consecutive integers** are integers in counting order, such as  $-3$ ,  $-2$ , and  $-1$ .

**Examples**

a. Solve  $\frac{2x - 3}{4} = 9$ .

Multiply each side by 4 to eliminate the fraction.

$$4\left(\frac{2x - 3}{4}\right) = 9(4)$$

$$2x - 3 = 36$$

Next, undo the subtraction by adding 3 to each side.

$$2x - 3 + 3 = 36 + 3$$

$$2x = 39$$

Last, undo the multiplication by dividing each side by 2.

$$\frac{2x}{2} = \frac{39}{2}$$

$$x = 19\frac{1}{2}$$

b. Find 3 consecutive odd integers whose sum is  $-3$ .

Let  $n$  = the least odd integer. Then  $n + 2$  = the next greater odd integer, and  $n + 4$  = the greatest of the three odd integers.

$$n + (n + 2) + (n + 4) = -3$$

$$3n + 6 = -3$$

Add like items.

$$3n + 6 - 6 = -3 - 6$$

Subtract 6 from each side.

$$3n = -9$$

Simplify.

$$\frac{3n}{3} = \frac{-9}{3}$$

Divide each side by 3.

$$n = -3$$

Simplify.

$n + 2 = -3 + 2$  or  $-1$  and  $n + 4 = -3 + 4$  or  $1$ , so the consecutive odd integers are  $-3$ ,  $-1$ , and  $1$ .

**Practice**

Solve each equation. Check your solution.

1.  $10 - 7p = -18$

2.  $-1.9r + 9.3 = 15$

3.  $6 = \frac{s}{3}$

4.  $\frac{-4m - 3}{-6} = -9$

5.  $-6 = \frac{-2n - 3}{4}$

6.  $\frac{t}{5} - 4 = -10$

7.  $11 = -7 - \frac{g}{3}$

8.  $\frac{5}{6}b + 8 = -11$

9.  $13 = -8 - 3t$

10.  $-\frac{3+n}{7} = -5$

11.  $\frac{s+4}{-2} = -16$

12.  $3 - 9t = 21$

Define a variable, write an equation, and solve each problem.

13. Find two consecutive odd integers whose sum is 128.

14. Find three consecutive even integers whose sum is 90.

15. **Standardized Test Practice** Sally is eight years older than John. John is fourteen years older than Kareem. If the sum of all three ages is 90, how old is Kareem?

A 8

B 18

C 28

D 40

Answers: 1. 4 2. -3 3. 18 4. -14 5. 10 6. -30 7. -54 8. -22 9. -7 10. 32 11. 28 12. -2 13. 63, 65 14. 28, 30, 32 15. B