

# Equations (Pages 112–116)

A **statement** is any sentence that is either true or false, but not both. Mathematical statements with one or more variables are called **open sentences**. An open sentence is neither true nor false until the variable has been replaced by a value. Finding a replacement for the variable that results in a true sentence is called **solving** the open sentence. This replacement is called a **solution** of the open sentence. A set of numbers from which replacements for a variable may be chosen is called a **replacement set**.

## EXAMPLES

**A** Find the solution of  $3m - 4 = 14$  if the replacement set is  $\{4, 5, 6, 7\}$ .

Value for $m$	$3m - 4 = 14$	True or False?
4	$3(4) - 4 \stackrel{?}{=} 14$	False
5	$3(5) - 4 \stackrel{?}{=} 14$	False
6	$3(6) - 4 \stackrel{?}{=} 14$	True
7	$3(7) - 4 \stackrel{?}{=} 14$	False

So, the solution set of  $3m - 4 = 14$  is 6.

**B** Solve  $g = \frac{36 \div 6 - 1}{5 \cdot 4}$ .

Evaluate numerator and denominator separately.

$$g = \frac{36 \div 6 - 1}{5 \cdot 4}$$

$$g = \frac{5}{20} \quad 36 \div 6 - 1 = 6 - 1 \text{ or } 5$$

$$g = \frac{1}{4} \quad \text{Simplify.}$$

## PRACTICE

Find the solution of each equation if the replacement sets are  $a = \{3, 4, 5\}$ ,  $b = \{-3, -2, -1\}$ , and  $c = \{-1, 0, 1, 2\}$ .

1.  $2 - a = -2$

2.  $c + 1 = 0$

3.  $4b + 20 = 12$

4.  $5a - 3(7) = 4$

5.  $\frac{-11 - 4}{3} = -5c$

6.  $\frac{b + (-9)}{-6} = 2$

Solve each equation.

7.  $f = 6(-3) + 7 - 4$

8.  $z = 2(3 - 12 \div 4)$

9.  $x = 8 - 4 \cdot 7$

10.  $\frac{3 \cdot 9 + 5}{16 \div 4} = n$

11.  $q = \frac{-18 \div 2 + 12}{21 \div 3}$

12.  $\frac{8 \cdot 9 - 6}{13 - 2} = g$



**13. Standardized Test Practice** Solve the equation  $p = \frac{-2 + 28 \div 2}{9 - 3 \cdot 5}$ .

A -2

B 2

C  $\frac{13}{30}$

D  $\frac{1}{2}$

Answers: 1. 4 2. -1 3. -2 4. 5 5. 1 6. -3 7. -3 8. 0 9. -20 10. 8 11.  $\frac{7}{3}$  12. 6 13. A