Solving Equations with Multiplication and Division

You can solve equations in which a variable has a coefficient by using the multiplication and division properties of equality.

Multiplicative Property of Equality	For any numbers a, b, and c, with $c \neq 0$, if $a = b$, then $ac = bc$.
Division Property of Equality	For any numbers a, b, and c, with $c \neq 0$, if $a = b$, then $\dfrac{a}{c} = \dfrac{b}{c}$.

Example 1: Solve $\frac{1}{4}n = 16$.

$$\frac{1}{4}n = 16$$

$$4\left(\frac{1}{4}n\right) = 4(16)$$

$$n = 64$$

Check: $\frac{1}{4}n = 16$

$$\frac{1}{4}(64) \overset{?}{=} 16$$

$$16 = 16 \; ✔$$

Example 2: Solve $8n = 64$.

$$8n = 64$$

$$\frac{8n}{8} = \frac{64}{8}$$

$$n = 8$$

Check: $8n = 64$

$$8(8) \overset{?}{=} 64$$

$$64 = 64 \; ✔$$

Solve each equation. Then check your solution.

1. $-3r = -24$

2. $8s = -64$

3. $-3t = 51$

4. $\frac{1}{4}w = -16$

5. $6x = \frac{3}{4}$

6. $1\frac{1}{4}y = -3\frac{3}{4}$

Define a variable, write an equation, and solve each problem. Then check your solution.

7. Twelve times a number is 96. What is the number?

8. One half of a number is fifteen. What is the number?

9. Negative four times a number is -112. What is the number?

10. Regina paid $53.50 for 5 basketball tickets. What is the cost of each ticket?

Complete.

11. If $4x = 100$, then $8x =$ _____.

12. If $6y = 36$, then $3y =$ _____.

13. If $-10a = 53$, then $-5a =$ _____.

14. If $2g + h = 12$, then $4g + 2h =$ _____.