

4-4 Study Guide and Intervention**Solving Equations by Multiplying or Dividing**

Solve Equations by Dividing Just as addition and subtraction are inverse operations, multiplication and division are inverse operations. To isolate a variable in an equation involving multiplication, you can apply the Division Property of Equality.

Division Property of Equality

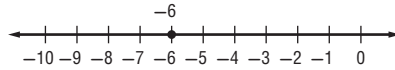
If you divide each side of an equation by the same nonzero number, the two sides remain equal.

Example Solve $-7x = 42$. Check your solution and graph it on a number line.

$$\begin{array}{ll} -7x = 42 & \text{Write the equation.} \\ \frac{-7x}{-7} = \frac{42}{-7} & \text{Division Property of Equality} \\ 1x = -6 & -7 \div -7 = 1, 42 \div -7 = -6 \\ x = -6 & \text{Identity Property; } 1x = x \end{array}$$

CHECK: $-7x = 42$ Write the equation.
 $-7(-6) \stackrel{?}{=} 42$ Replace x with -6 and check to see if the sentence is true.
 $42 = 42$ ✓ The sentence is true.

The solution is -6 .



To graph -6 , draw a dot at -6 on the number line.

Exercises

Solve each equation. Check your solution.

1. $-3a = 15$

2. $-t = 5$

3. $7r = 28$

4. $24 = -8m$

5. $-11b = 44$

6. $12d = -48$

7. $-10p = 10$

8. $-11w = -33$

9. $12g = 42$

10. $-11r = 121$

11. $6d = 126$

12. $12b = 108$

13. $0.4m = 20.4$

14. $-0.7y = 8.4$

15. $0.9t = 0.63$

4-4 Study Guide and Intervention *(continued)***Solving Equations by Multiplying or Dividing**

Solve Equations by Multiplying To isolate a variable in an equation in which a variable is divided, you can apply the Multiplication Property of Equality.

Multiplication Property of Equality

If you multiply each side of an equation by the same number, the two sides remain equal.

Example 1 Solve $\frac{y}{2} = -2$.

$$\frac{y}{2} = -2$$

Write the equation.

$$2 \cdot \frac{y}{2} = 2 \cdot (-2)$$

Multiplication Property of Equality

$$1y = -4$$

Multiplicative Inverse Property; $2 \cdot \frac{1}{2} = 1$

$$y = -4$$

Identity Property; Check your solution.

Example 2 Solve $-\frac{5}{6}b = 15$.

$$-\frac{5}{6}b = 15$$

Write the equation.

$$-\frac{6}{5} \left(-\frac{5}{6} \right) b = -\frac{6}{5} \left(\frac{15}{1} \right)$$

Multiply each side by $-\frac{6}{5}$, which is the reciprocal of $-\frac{5}{6}$.

$$1b = -18$$

Multiplicative Inverse Property; $-\frac{6}{5} \left(-\frac{5}{6} \right) = 1$

$$b = -18$$

Identity Property; Check your solution.

Exercises

Solve each equation. Check your solution.

1. $-1 = \frac{n}{4}$

2. $0 = \frac{h}{7}$

3. $\frac{a}{-2} = -1$

4. $\frac{r}{-5} = -1$

5. $\frac{a}{5} = 22$

6. $\frac{1}{4}q = 8$

7. $\frac{-t}{10} = -14$

8. $\frac{-m}{6} = -12$

9. $\frac{3}{8}j = 18$

10. $\frac{-2}{3}g = 30$

11. $\frac{7}{8}k = 49$

12. $\frac{v}{-15} = 4$

13. $\frac{9}{11}p = 72$

14. $\frac{-w}{25} = 25$

15. $\frac{4}{5}f = 64$