Lesson 8 Reteach

Solving Multi-Step Equations and Inequalities

Equations with grouping symbols can be solved by first using the Distributive Property to remove the grouping symbols.

Example 1   Solve $2(6m - 1) = 8m$. Check your solution.

$2(6m - 1) = 8m$	Write the equation.
$12m - 2 = 8m$	Distributive Property
$12m - 12m - 2 = 8m - 12m$	Subtraction Property of Equality
$-2 = -4m$	Simplify.
$\dfrac{-2}{-4} = \dfrac{-4m}{-4}$	Division Property of Equality
$\dfrac{1}{2} = m$	Simplify.

Check $2(6m - 1) = 8m$ Write the equation.

$2\left[6\left(\dfrac{1}{2}\right) - 1\right] \stackrel{?}{=} 8\left(\dfrac{1}{2}\right)$ Replace m with $\dfrac{1}{2}$.

$2(3 - 1) \stackrel{?}{=} 4$ Simplify.

$4 = 4 ✓$ The solution checks.

Some equations have no solution. The solution set is the **null** or **empty set,** which is represented by Ø. Other equations have every number as a solution. Such an equation is called an **identity.**

Example 2   Solve each equation.

a. $2(x - 1) = 4 + 2x$
$2x - 2 = 4 + 2x$
$2x - 2x - 2 = 4 + 2x - 2x$
$-2 = 4$

The statement $-2 = 4$ is *never* true. The equation has no solutions and the solution set is Ø.

b. $-2(x - 1) = 2 - 2x$
$-2x + 2 = 2 - 2x$
$-2x + 2 - 2 = 2 - 2 - 2x$
$-2x = -2x$
$x = x$

The statement $x = x$ is *always* true. The equation is an identity and the solution set is all numbers.

Exercises

Solve. Check your solutions.

1. $8(g - 3) = 24$

2. $5(x + 3) = 25$

3. $2(3d + 7) = 5 + 6d$

4. $2(s + 11) = 5(s + 2)$

5. $7y - 1 = 2(y + 3) - 2$

6. $2(f + 3) - 2 = 8 + 2f$

7. $2(x - 2) + 3 = 2x - 1$

8. $1 + 2(b + 6) = 5(b - 1)$

9. $2x - 5 = 3(x + 3)$

Lesson 8 Homework Practice

Solving Multi-Step Equations and Inequalities

Solve. Check your solutions.

1. $4(j - 7) = 12$

2. $5(2k + 10) = 40$

3. $7(2p + 3) - 8 = 14p - 13$

4. $7(g - 4) = 3$

5. $3(4c + 5) = 24$

6. $2(a - 1) = 3(a + 1)$

7. $3(x - 3) = 5(1.5 + x)$

8. $2(1.5m + 3) = 3.5m - 1$

9. $a - \frac{1}{2} = 2a - \frac{3}{5}$

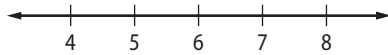**10.** $2\frac{1}{5}x - 5 = 2(1\frac{2}{5}x + 3)$

11. $\frac{d}{0.2} = 3d + 2.1$

12. $5n + 3 = 2(n + 2) + 3n$

13. $\frac{2}{3}a + 2 = \frac{1}{3}(4a + 1)$

14. $y - 7 = \frac{1}{4}(y + 2)$
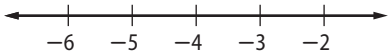
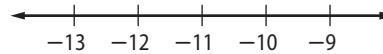**Solve. Graph each solution on a number line.**

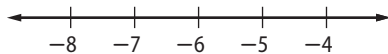**15.** $\frac{2}{3}(12 - x) > 4$

16. $\frac{1}{2}(8 - c) < 7.5$
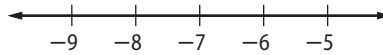
17. $\frac{c}{3} + 7 > 5\frac{1}{2}$

18. $7 + 2p < -14$

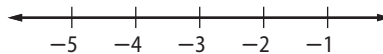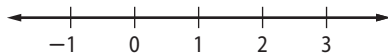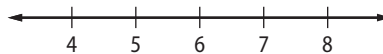**19.** $-3(x + 3) > 7.5$

20. $5 - 3c \le c + 17$

21. $2(n - 5) \le -7$

22. $\frac{18 - n}{2} \le 6$

23. The perimeter of a rectangle is 80 feet. Find the dimensions if the length is 5 feet longer than four times the width. Then find the area of the rectangle.

24. Five times the sum of three consecutive integers is 150. What are the integers?

25. Admission to the state fair costs $5 and each ride costs $0.75. If Ahmed wants to spend no more than $14 at the fair, how many rides can he ride?