

# 3-2 Solve Inequalities Using Addition or Subtraction

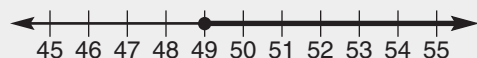
Name \_\_\_\_\_ Date \_\_\_\_\_

**Solve:**  $d - 34 \geq 15$  ← subtraction inequality

$$d - 34 + 34 \geq 15 + 34 \quad \leftarrow \text{Use the Addition Property of Inequality.}$$

$$d \geq 49$$

**Graph:**  $d \geq 49$



The graph shows the solution set for  $\{d \mid d \geq 49\}$  or  $[49, \infty)$ .

**Check:**

$$\text{Try } d = 49 \rightarrow 49 - 34 \stackrel{?}{\geq} 15$$

$$15 \geq 15 \text{ True}$$

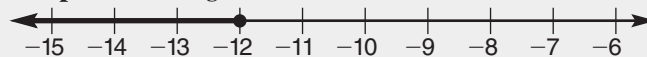
**Solve:**  $12 - 4 \geq 3g - 2g + 20$  ← addition inequality

$$8 \geq g + 20 \quad \leftarrow \text{Combine like terms.}$$

$$8 - 20 \geq g + 20 - 20 \quad \leftarrow \text{Use the Subtraction Property of Inequality.}$$

$$-12 \geq g$$

**Graph:**  $-12 \geq g$



The graph shows the solution set for  $\{g \mid g \leq -12\}$  or  $(-\infty, -12]$ .

**Check:**

$$\text{Try } g = -12 \rightarrow 12 - 4 \stackrel{?}{\geq} 3(-12) - 2(-12) + 20$$

$$8 \stackrel{?}{\geq} -12 + 20$$

$$8 \geq 8 \text{ True}$$

**Solve each inequality. Check to justify your solutions.**

1.  $t - 6 > 7$

$$t - 6 + 6 > 7 + 6$$

$$t > 13$$

**Check:** Let  $t = 14$

$$14 - 6 \stackrel{?}{>} 7$$

$$8 > 7 \text{ True}$$

2.  $h - 9 > 11$

3.  $p - 5.3 \leq 4.0$

4.  $\ell - 6.7 \leq 2.9$

5.  $12 < s + 7$

6.  $20 < m + 14$

7.  $-29 > j - 19$

8.  $-33 > p - 2$

9.  $-85 \geq q - 24$

10.  $-51 \geq k - 63$

11.  $4n - 3n + 3 \geq -23$

12.  $9y + 39 - 8y \geq -22$



Solve each inequality. Write the solution set in both set-builder and interval notation. On a separate sheet of paper, graph and check the solution set.

13.  $f + 2 < 12 - 15$

$$f + 2 < -3$$

$$f + 2 - 2 < -3 - 2$$

$$f < -5; \{f \mid f < -5\}; (-\infty, -5)$$

14.  $q + 5 < 14 - 26$

15.  $h - 5 > -7 + 21$

16.  $r - 2 > -7 + 17$

17.  $5h - 4h - 2 \geq 5$

18.  $6d - 5d - 7 \geq 15$

19.  $5 \leq 3 + 4r - 3r + 7$

20.  $7 \leq 5 + 7g - 6g + 11$

21.  $25 - 11 < 5t - 4t - 9$

22.  $31 - 24 < 7t - 6t - 3$

23.  $11d + 15 - 10d > 9 - 25$

24.  $17b + 42 - 16b > 28 - 33$

25.  $-5x + 12 + 6x \leq 13 - (-7)$

26.  $9v - 18 + (-8v) < 64 + (-48)$

27.  $94 + (-72) > 10z - 22 - 9z$

Solve. Show your work.

28. Victoria made 8 more baskets than Yolanda at a game. If Victoria made at most 12 baskets, how many baskets could Yolanda have made?

29. After Mr. Cheng spent \$145 on groceries and \$29 on office supplies, he had at least \$78 in his wallet. What is the least amount he could have started with, if he paid cash?

## CHALLENGE

30. Solve the inequality  $x - k < 24$  for  $x$ . Then determine the set of values of  $k$  that would make the solution set contain only negative numbers.