

2.1 Writing and Graphing Inequalities (pp. 53–60)

- a. A number x plus 36 is no more than 40. Write this sentence as an inequality.

$$\underbrace{\text{A number } x \text{ plus } 36}_{x + 36} \text{ is no more than } \underbrace{40}_{40}.$$

$$x + 36 \leq 40$$

▶ An inequality is $x + 36 \leq 40$.

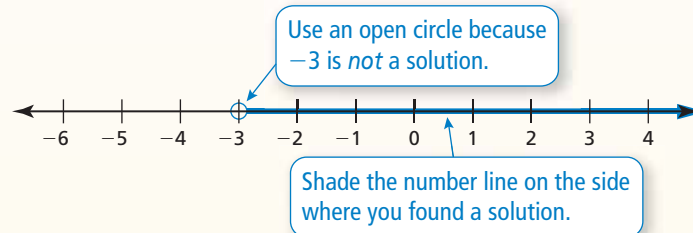
- b. Graph $w > -3$.

Test a number to the left of -3 .

$w = -4$ is *not* a solution.

Test a number to the right of -3 .

$w = 0$ is a solution.



Write the sentence as an inequality.

1. A number d minus 2 is less than -1 .
2. Ten is at least the product of a number h and 5.

Graph the inequality.

3. $x > 4$
4. $y \leq 2$
5. $-1 \geq z$

2.2 Solving Inequalities Using Addition or Subtraction (pp. 61–66)

Solve $x + 2.5 \leq -6$. Graph the solution.

$$x + 2.5 \leq -6$$

Write the inequality.

Subtraction Property of Inequality

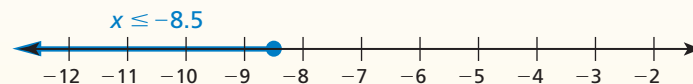
$$\rightarrow \begin{array}{r} -2.5 \\ -2.5 \end{array}$$

Subtract 2.5 from each side.

$$x \leq -8.5$$

Simplify.

▶ The solution is $x \leq -8.5$.



Solve the inequality. Graph the solution.

6. $p + 4 < 10$
7. $r - 4 < -6$
8. $2.1 \geq m - 6.7$

2.3 Solving Inequalities Using Multiplication or Division (pp. 67–72)

Solve $\frac{n}{-10} > 5$. Graph the solution.

$$\frac{n}{-10} > 5$$

Write the inequality.

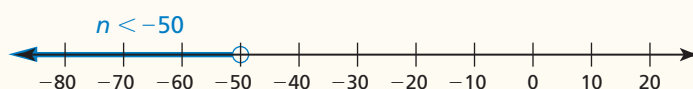
Multiplication Property of Inequality $\rightarrow -10 \cdot \frac{n}{-10} < -10 \cdot 5$

Multiply each side by -10 . Reverse the inequality symbol.

$$n < -50$$

Simplify.

▶ The solution is $n < -50$.



Solve the inequality. Graph the solution.

9. $3x > -21$

10. $-4 \leq \frac{g}{5}$

11. $-\frac{3}{4}n \leq 3$

12. $\frac{s}{-8} \geq 11$

13. $36 < 2q$

14. $-1.2k > 6$

2.4 Solving Multi-Step Inequalities (pp. 73–78)

Solve $22 + 3y \geq 4$. Graph the solution.

$$22 + 3y \geq 4$$

Write the inequality.

$$\underline{-22} \quad \underline{-22}$$

Subtract 22 from each side.

$$3y \geq -18$$

Simplify.

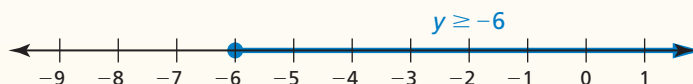
$$\frac{3y}{3} \geq \frac{-18}{3}$$

Divide each side by 3.

$$y \geq -6$$

Simplify.

▶ The solution is $y \geq -6$.



Solve the inequality. Graph the solution, if possible.

15. $3x - 4 > 11$

16. $-4 < \frac{b}{2} + 9$

17. $7 - 3n \leq n + 3$

18. $2(-4s + 2) \geq -5s - 10$

19. $6(2t + 9) \leq 12t - 1$

20. $3r - 8 > 3(r - 6)$

2.5 Solving Compound Inequalities (pp. 81–86)

Solve $-1 \leq -2d + 7 \leq 9$. Graph the solution.

$$-1 \leq -2d + 7 \leq 9$$

Write the inequality.

$$\frac{-7}{-2} \leq \frac{-2d}{-2} \leq \frac{2}{-2}$$

Subtract 7 from each expression.

$$-8 \leq -2d \leq 2$$

Simplify.

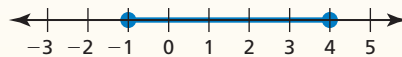
$$\frac{-8}{-2} \geq \frac{-2d}{-2} \geq \frac{2}{-2}$$

Divide each expression by -2 .
Reverse each inequality symbol.

$$4 \geq d \geq -1$$

Simplify.

▶ The solution is $-1 \leq d \leq 4$.



21. A number x is more than -6 and at most 8 . Write this sentence as an inequality. Graph the inequality.

Solve the inequality. Graph the solution.

22. $19 \geq 3z + 1 \geq -5$

23. $\frac{r}{4} < -5$ or $-2r - 7 \leq 3$

2.6 Solving Absolute Value Inequalities (pp. 87–92)

Solve $|2x + 11| + 3 > 8$. Graph the solution.

$$|2x + 11| + 3 > 8$$

Write the inequality.

$$\frac{-3}{-2} \leq \frac{-3}{-2}$$

Subtract 3 from each side.

$$|2x + 11| > 5$$

Simplify.

$$2x + 11 < -5 \quad \text{or} \quad 2x + 11 > 5$$

Write a compound inequality.

$$\frac{-11}{2} < \frac{-11}{2} \quad \frac{-11}{2} < \frac{-11}{2}$$

Subtract 11 from each side.

$$2x < -16 \quad 2x > -6$$

Simplify.

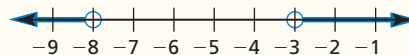
$$\frac{2x}{2} < \frac{-16}{2} \quad \frac{2x}{2} > \frac{-6}{2}$$

Divide each side by 2.

$$x < -8 \quad \text{or} \quad x > -3$$

Simplify.

▶ The solution is $x < -8$ or $x > -3$.



Solve the inequality. Graph the solution, if possible.

24. $|m| \geq 10$

25. $|k - 9| < -4$

26. $4|f - 6| \leq 12$

27. $5|b + 8| - 7 > 13$

28. $|-3g - 2| + 1 < 6$

29. $|9 - 2j| + 10 \geq 2$

30. A safety regulation states that the height of a guardrail should be 106 centimeters with an absolute deviation of no more than 7 centimeters. Write and solve an absolute value inequality that represents the acceptable heights of a guardrail.

2 Chapter Test

Write the sentence as an inequality.

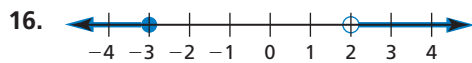
- The sum of a number y and 9 is at least -1 .
- A number r is more than 0 or less than or equal to -8 .
- A number k is less than 3 units from 10.

Solve the inequality. Graph the solution, if possible.

- $\frac{x}{2} - 5 \geq -9$
- $-7 < 2c - 1 < 10$
- $|2q + 8| > 4$
- $-4s < 6s + 1$
- $-2 \leq 4 - 3a \leq 13$
- $-2|y - 3| - 5 \geq -4$
- $4p + 3 \geq 2(2p + 1)$
- $-5 < 2 - h$ or $6h + 5 > 71$
- $4|-3b + 5| - 9 < 7$
- You start a small baking business, and you want to earn a profit of at least \$250 in the first month. The expenses in the first month are \$155. What are the possible revenues that you need to earn to meet the profit goal?
- A manufacturer of bicycle parts requires that a bicycle chain have a width of 0.3 inch with an absolute deviation of at most 0.0003 inch. Write and solve an absolute value inequality that represents the acceptable widths.
- Let a , b , c , and d be constants. Describe the possible solution sets of the inequality $ax + b < cx + d$.



Write and graph a compound inequality that represents the numbers that are *not* solutions of the inequality represented by the graph shown. Explain your reasoning.



- A state imposes a sales tax on items of clothing that cost more than \$175. The tax applies only to the difference of the price of the item and \$175.
 - Use the receipt shown to find the tax rate (as a percent).
 - A shopper has \$430 to spend on a winter coat. Write and solve an inequality to find the prices p of coats that the shopper can afford. Assume that $p \geq 175$.
 - Another state imposes a 5% sales tax on the entire price of an item of clothing. For which prices would paying the 5% tax be cheaper than paying the tax described above? Write and solve an inequality to find your answer and list three prices that are solutions.

