

9.10 Exercises

Concept Check

Fill-in-the-Blank. Complete each sentence using information found in this section.

- If an absolute value expression is isolated on one side of an inequality, the inequality is in _____ form.
- The inequality $|x - 6| > 5$ means that the _____ between x and 6 is _____ than 5.
- If $|x| > c$ then $x < -c$ _____ $x > c$.
- If an inequality is always true, such as $|3x - 8| > -6$, then the solution is all _____ numbers.

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

- If the solution is a union, there are two statements or inequalities, both of which must be true.
- If the solution to a compound inequality is $-4 < x < 6$, then the solution is a union.
- For a number to have absolute value greater than 2, its distance from 0 must be less than 2.
- The inequality $|2x + 9| < -2$ has no solution.

Practice

Solve each of the absolute value inequalities and graph the solution sets. Write each solution using interval notation. See Examples 1 through 9.

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|---------------------------|---|-----------------------------|
| 1. $ x \geq -2$ | 11. $ 2x - 1 \geq 2$ | 21. $ 2x - 9 - 7 \leq 4$ |
| 2. $ x \geq 3$ | 12. $ 3x + 4 > -8$ | 22. $ 3x - 7 + 4 \leq 4$ |
| 3. $ x \leq \frac{4}{5}$ | 13. $ 3 - 2x < -2$ | 23. $-4 < 6x - 1 + 4$ |
| 4. $ x \geq \frac{7}{2}$ | 14. $ 4 + 3x > 5$ | 24. $4 \leq 3x + 1 - 6$ |
| 5. $ x - 3 > 2$ | 15. $ 5 + 4x \leq 3$ | 25. $5 > 4 - 2x + 2$ |
| 6. $ y - 4 \leq 5$ | 16. $ 5x - 2 < 8$ | 26. $7 > 8 - 5x + 3$ |
| 7. $ x + 6 \leq 4$ | 17. $ 3x + 4 - 1 < 0$ | 27. $3 4x + 5 - 5 > 10$ |
| 8. $ x + 2 \leq -4$ | 18. $ 2x - 3 - 3 \leq 0$ | 28. $6 4x - 7 + 7 > 19$ |
| 9. $ x + 5 \geq 3$ | 19. $\left \frac{3x}{2} - 4 \right \geq 5$ | 29. $4 7x + 9 - 3 < 17$ |
| 10. $ x - 1 < 6$ | 20. $\left \frac{3}{7}y + \frac{1}{2} \right > 2$ | 30. $2 7x - 3 + 4 \geq 12$ |

Writing & Thinking

A set of real numbers is described. **a.** Sketch a graph of the set on a real number line. **b.** Represent each set using absolute value notation. **c.** Represent each set using interval notation. If the set is one interval, state what type of interval it is.

31. The set of real numbers between -10 and 10 , inclusive
32. The set of real numbers within 7 units of 4
33. The set of real numbers more than 6 units from 8
34. The set of real numbers greater than or equal to 3 units from -1
35. The set of real numbers within 2 units of -5