3.6 Exercises

Concept Check

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

1. If an absolute value expression is isolated on one side of an inequality, the inequality is in _____ form.
2. The inequality $|x - 6| > 5$ means that the _____ between x and 6 is ____ than 5.
3. If $|x| > c$ then $x < -c$ _____ $x > c$.
4. 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.)

5. If the solution is a union, there are two statements or inequalities, both of which must be true.
6. If the solution to a compound inequality is $-4 < x < 6$, then the solution is a union.
7. For a number to have absolute value greater than 2, its distance from 0 must be less than 2.
8. 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.

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