

Challenge: Skills and Applications

For use with pages 353–358

In Exercises 1–2, solve the equation.

1. $|x - 3| = \frac{x}{4}$

2. $|5 - x| = x$

3. For what real numbers
- x
- is it true that
- $|x| \leq x$
- ? For what real numbers
- x
- is
- $|x| \geq x$
- ?

In Exercises 4–6, solve the inequality.

4. $|x + 7| = x + 7$

5. $|n - 3| > n - 3$

6. $|4 - b| < 4 - b$

In Exercises 7–10, find the solution. Indicate if an equation is an identity or there is no solution.

7. $|5x| = 5|x|$

8. $|x + 3| = |x| + 3$

9. $|x| - 1 = |x| + 1$

10. $|x| + |-x| = 8$

In Exercises 11–14, use the following information.

Greg Jones is driving on a straight road that passes through the town of Westview. In Westview there is a radio station that can be heard anywhere within a 20-mile radius of the town. Greg started 50 miles away from Westview at noon, and he is driving at a rate of 40 miles/hour towards it.

- Write an inequality, valid for the time before Greg reaches Westview, that states that his distance from Westview, expressed as a function of his driving time t (in hours), is less than or equal to 20 miles.
- Write an inequality corresponding to the one from Exercise 11 for the time after Greg passes through Westview.
- Combine the inequalities from Exercises 11 and 12 into one inequality using absolute value.
- Solve the inequality from Exercises 13. Then find the time interval during which Greg will be able to hear the Westview radio station on his car radio.