NAME ______________________ DATE __________

Challenge: Skills and Applications

For use with pages 50–56

In Exercises 1–3, solve the inequality.

1. $|2x - 5| \leq 3$ **2.** $\left|\frac{x}{3} + 4\right| > 7$ **3.** $|-4x + 9| \geq 7$

4. a. Prove that the inequality $|a + b| \leq |a| + |b|$ holds for all real numbers.

b. Give an example to show that it can happen that $|a + b| < |a| + |b|$.

In Exercises 5–7, write as an absolute value inequality, without any squares.

5. $x^2 < 25$ **6.** $(x - 3)^2 > 16$ **7.** $-3(x + 4)^2 > 12$

In Exercises 8–10, solve the inequality. (*Hint:* Locate the points that satisfy the inequality on a number line.)

8. $|x - 2| + |x - 3| \leq 1$ **9.** $|x - 4| + |x - 1| > 5$ **10.** $|x - 7| + |x - 2| > 4$

In Exercises 11–13, rewrite as a single inequality involving absolute value.

11. $x < -2$ or $x > 10$ **12.** $-13 \leq x \leq 5$ **13.** $x + 3 < -1$ or $x - 5 > 11$

In Exercises 14–15, solve the inequality.

Example: $|x - 3| < |x - 1|$

Solution: Since $|x - 3|$ represents the distance from x to 3 on the number line, and $|x - 1|$ represents the distance from x to 1, this inequality says that the distance from x to 3 must be less than the distance from x to 1. Therefore, the solution is $x > 2$.

14. $|x - 5| > |x + 7|$ **15.** $|2x - 3| \leq |2x - 7|$