NAME _____ DATE _____

Challenge: Skills and Applications

For use with pages 360–366

In Exercises 1–2, write a linear inequality satisfying the given conditions.

Example: The points $(2, -3)$ and $(4, 1)$ are on the boundary of the graph of the inequality, and are solutions of the inequality. The point $(1, 5)$ is a solution of the inequality.

Solution: The slope of the boundary line is $\frac{1 - (-3)}{4 - 2} = 2$. Substituting $(4, 1)$ into the equation $y = 2x + b$ gives a value of -7 for b. Therefore, the equation of the boundary line is $y = 2x - 7$. Since $(1, 5)$ must satisfy the inequality, and since 5 is larger than $2(1) - 7$, the inequality sign is ">" or "≥." Because points $(2, -3)$ and $(4, 1)$ on the boundary line are solutions, the inequality is $y \geq 2x - 7$.

1. The points $(-3, 5)$ and $(7, 9)$ are on the boundary of the graph of the inequality and are solutions of the inequality. The origin is a solution of the inequality.

2. The boundary of the graph has slope $-\frac{1}{3}$ and passes through $(6, 7)$. The points on the boundary line are not solutions of the inequality. The point $(-3, 4)$ is a solution of the inequality.

In Exercises 3–6, use the following information.

Jean and Lisa Fisher have one phone in their home, which their parents let them use only between 8:00 P.M. and 9:30 P.M. Let x and y represent the numbers of minutes spent on the phone one evening by Jean and Lisa, respectively.

3. Write an inequality that models their parents' restriction on phone use.

4. Sketch the graph of the inequality.

5. How would the graph change if the sisters were given special permission to use the phone until 10:00 P.M.?

6. How would the graph change if Jean could still use the phone anytime from 8:00 P.M. until 9:30 P.M., but Lisa was required to be off the phone by 9:00 P.M.?