

Challenge: Skills and Applications

For use with pages 432–438

In Exercises 1–2, graph the system of inequalities.

1. $y < x + 4$

$y < -\frac{3}{2}x + 4$

$y \geq \frac{1}{2}|x|$

2. $|x| < 3$

$y > x - 1$

$y < x + 1$

In Exercises 3–5, use the following information.

Teresa Sanchez sells two sizes of outdoor doghouses: large and small. The large size requires 12 board-feet of lumber and takes 3 hours to build. The small size requires 8 board-feet of lumber and takes 1 hour to build. Teresa can use 48 board-feet of lumber each day and plans to spend at most 9 hours per day building dog houses.

3. Model the situation above. Your algebraic model should be a system of four inequalities. (Remember that Teresa cannot build a negative number of dog houses.)
4. Graph the system of inequalities from Exercise 3.
5. Teresa sells her large dog houses for \$70 each and her small ones for \$30 each. What numbers of each kind should she make per day in order to maximize her income from sales? (*Hint:* The maximum income must occur at one of the vertices of the graph.)