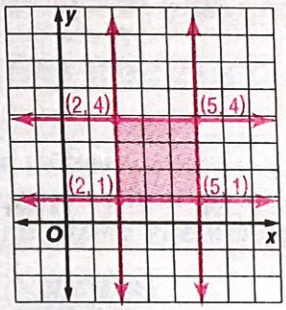
NAME _____ DATE _____ PERIOD _____

3-4 Skills Practice

Linear Programming

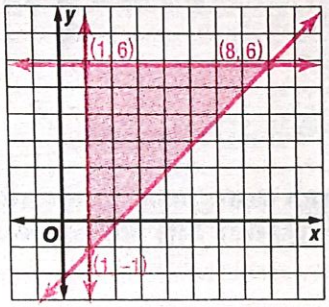
Graph each system of inequalities. Name the coordinates of the vertices of the feasible region. Find the maximum and minimum values of the given function for this region.

1. $x \geq 2$
$x \leq 5$
$y \geq 1$
$y \leq 4$
$f(x, y) = x + y$



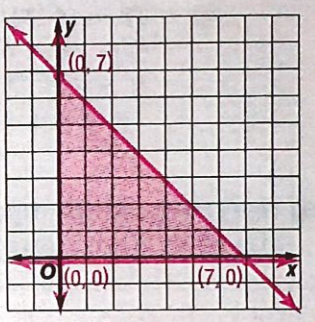
max.: 9, min.: 3

2. $x \geq 1$
$y \leq 6$
$y \geq x - 2$
$f(x, y) = x - y$



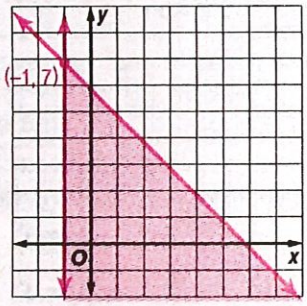
max.: 2, min.: −5

3. $x \geq 0$
$y \geq 0$
$y \leq 7 - x$
$f(x, y) = 3x + y$



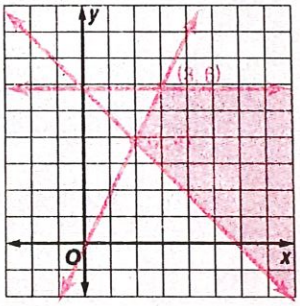
max.: 21, min.: 0

4. $x \geq -1$
$x + y \leq 6$
$f(x, y) = x + 2y$



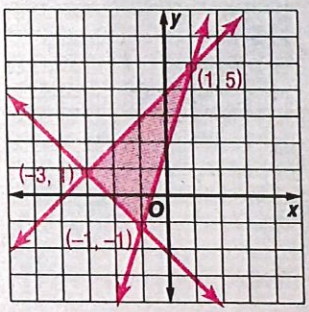
max.: 13, no min.

5. $y \leq 2x$
$y \geq 6 - x$
$y \leq 6$
$f(x, y) = 4x + 3y$



no max., min.: 20

6. $y \geq -x - 2$
$y \geq 3x + 2$
$y \leq x + 4$
$f(x, y) = -3x + 5y$



max.: 22, min.: −2

7. MANUFACTURING A backpack manufacturer produces an internal frame pack and an external frame pack. Let x represent the number of internal frame packs produced in one hour and let y represent the number of external frame packs produced in one hour. Then the inequalities $x + 3y \leq 18$, $2x + y \leq 16$, $x \geq 0$, and $y \geq 0$ describe the constraints for manufacturing both packs. Use the profit function $f(x) = 50x + 80y$ and the constraints given to determine the maximum profit for manufacturing both backpacks for the given constraints. **$620**

Lesson 3-4

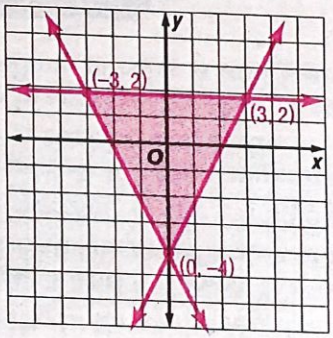
NAME _____ DATE _____ PERIOD _____

3-4 Practice (Average)

Linear Programming

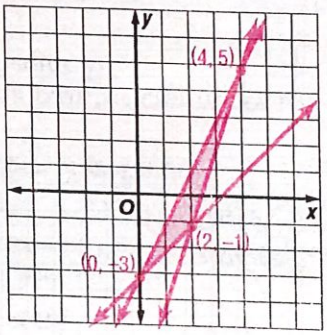
Graph each system of inequalities. Name the coordinates of the vertices of the feasible region. Find the maximum and minimum values of the given function for this region.

1. $2x - 4 \le y$
$-2x - 4 \le y$
$y \le 2$
$f(x, y) = -2x + y$



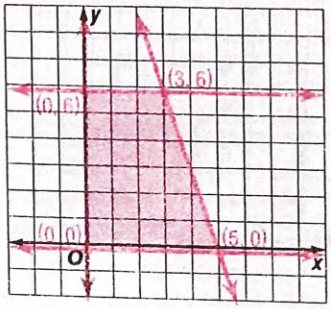
max.: 8, min.: −4

2. $3x - y \le 7$
$2x - y \ge 3$
$y \ge x - 3$
$f(x, y) = x - 4y$



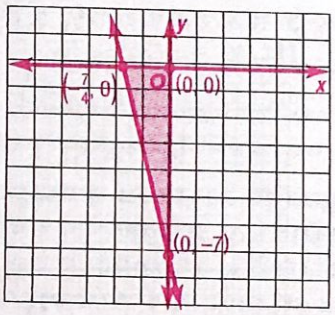
max.: 12, min.: −16

3. $x \ge 0$
$y \ge 0$
$y \le 6$
$y \le -3x + 15$
$f(x, y) = 3x + y$



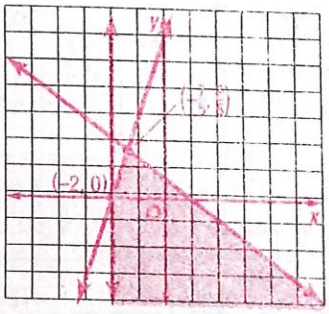
max.: 15, min.: 0

4. $x \le 0$
$y \le 0$
$4x + y \ge -7$
$f(x, y) = -x - 4y$



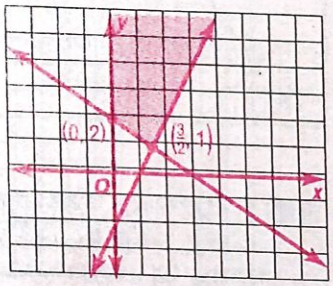
max.: 28, min.: 0

5. $y \le 3x + 6$
$4y + 3x \le 3$
$x \ge -2$
$f(x, y) = -x + 3y$



max.: $\frac{34}{5}$, no min.

6. $2x + 3y \ge 6$
$2x - y \le 2$
$x \ge 0$
$y \ge 0$
$f(x, y) = x + 4y + 3$



no max., min.: $\frac{17}{2}$

PRODUCTION For Exercises 7–9, use the following information.

A glass blower can form 8 simple vases or 2 elaborate vases in an hour. In a work shift of no more than 8 hours, the worker must form at least 40 vases.

7. Let s represent the hours forming simple vases and e the hours forming elaborate vases. Write a system of inequalities involving the time spent on each type of vase.
$s \ge 0, e \ge 0, s + e \le 8, 8s + 2e \ge 40$

8. If the glass blower makes a profit of \$30 per hour worked on the simple vases and \$35 per hour worked on the elaborate vases, write a function for the total profit on the vases.
$f(s, e) = 30s + 35e$

9. Find the number of hours the worker should spend on each type of vase to maximize profit. What is that profit? 4 h on each; \$260