Name _____ Class _____ Date _____

Practice 3-4

Linear Programming

Graph each system of constraints. Name all vertices. Then find the values of x and y that maximize or minimize the objective function.

1. $\begin{cases} x + 2y \le 6 \\ x \ge 2 \\ y \ge 1 \end{cases}$

Minimum for $C = 3x + 4y$

2. $\begin{cases} x + y \le 5 \\ x + 2y \le 8 \\ x \ge 0, y \ge 0 \end{cases}$

Maximum for $P = x + 3y$

3. $\begin{cases} x + y \le 6 \\ 2x + y \le 10 \\ x \ge 0, y \ge 0 \end{cases}$

Maximum for $P = 4x + y$

4. $\begin{cases} 3x + 2y \le 6 \\ 2x + 3y \le 6 \\ x \ge 0, y \ge 0 \end{cases}$

Maximum for $P = 4x + y$

5. $\begin{cases} 4x + 2y \le 4 \\ 2x + 4y \le 4 \\ x \ge 0, y \ge 0 \end{cases}$

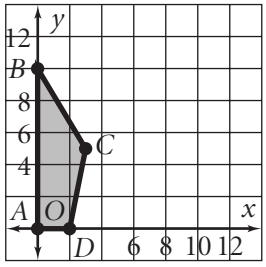
Maximum for $P = 3x + y$

6. $\begin{cases} x + y \le 5 \\ 4x + y \le 8 \\ x \ge 0, y \ge 0 \end{cases}$

Minimum for $C = x + 3y$

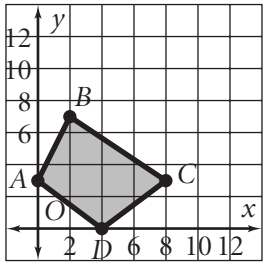
Find the values of x and y that maximize or minimize the objective function for each graph. Then find the maximum or minimum value.

7.



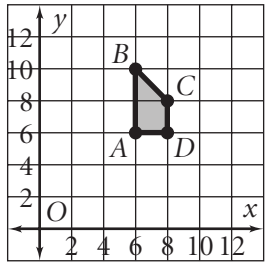
Maximize for $P = 2x + 3y$

8.



Minimize for $C = x + 2y$

9.



Maximize for $P = 3x + y$

10. You are going to make and sell bread. A loaf of Irish soda bread is made with 2 c flour and $\frac{1}{4}$ c sugar. Kugelhopf cake is made with 4 c flour and 1 c sugar. You will make a profit of \$1.50 on each loaf of Irish soda bread and a profit of \$4 on each Kugelhopf cake. You have 16 c flour and 3 c sugar.

a. How many of each kind of bread should you make to maximize the profit?

b. What is the maximum profit?

11. Suppose you make and sell skin lotion. A quart of regular skin lotion contains 2 c oil and 1 c cocoa butter. A quart of extra-rich skin lotion contains 1 c oil and 2 c cocoa butter. You will make a profit of \$10/qt on regular lotion and a profit of \$8/qt on extra-rich lotion. You have 24 c oil and 18 c cocoa butter.

a. How many quarts of each type of lotion should you make to maximize your profit?

b. What is the maximum profit?