Name _____ Class _____ Date _____

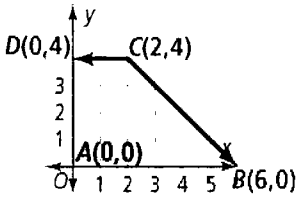
3-4 Practice

Form G

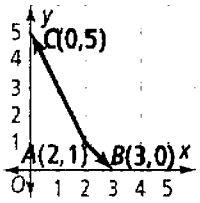
Linear Programming

Find the values of x and y that maximize or minimize the objective function for each graph.

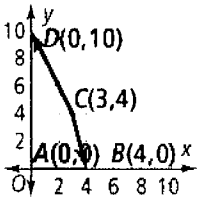
1. Maximum for $P = 6x + 2y$



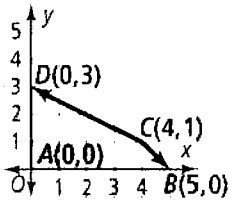
2. Minimum for $P = 4x + y$



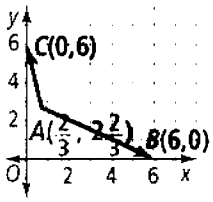
3. Maximum for $P = x + y$



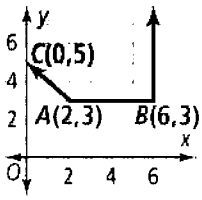
4. Maximum for $P = 2x + y$



5. Minimum for $P = x + 9y$



6. Minimum for $P = 5x + 10y$



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

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

Minimum for $C = 3x + 4y$

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

Maximum for $P = x + 3y$

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

Maximum for $P = 4x + y$

3-4 Practice (continued) *Form K*

Linear Programming

10. You are going to make and sell baked goods. 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 baked goods 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?

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

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

Maximum for $P = 4x + y$

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

Maximum for $P = 3x + y$

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

Minimum for $C = x + 3y$

15. Writing Explain why solving a system of linear equations is a necessary skill for linear programming.

16. A doctor allots 15 minutes for routine office visits and 45 minutes for full physicals. The doctor cannot do more than 10 physicals per day. The doctor has 9 available hours for appointments each day. A routine office visit costs \$60 and a full physical costs \$100. How many routine office visits and full physicals should the doctor schedule to maximize her income for the day? What is the maximum income?