

Chapter 7 Section 7

Write the objective function that describes the problem.

- 1) Mrs. White wants to crochet beach hats and baby afghans for a church fund-raising bazaar. She needs 7 hours to make a hat and 2 hours to make an afghan and she has 33 hours available. She wants to make no more than 9 items and no more than 7 afghans. The bazaar will sell the hats for \$19 each and the afghans for \$11 each. Let x equal the number of hats sold and y equal the number of afghans sold.

A) $z = 3x + 6y$

B) $z = 19x + 11y$

C) $z = 6x + 3y$

D) $z = 11x + 19y$

- 2) An office manager needs to buy new filing cabinets. Cabinet A costs \$5, takes up 5 square feet of floor space, and holds 9 cubic feet of files. Cabinet B costs \$8, takes up 10 square feet, and holds 13 cubic feet. He has only \$93 to spend and the office has room for no more than 105 square feet of cabinets. Let x equal the number of cabinet A's bought and y equal the number of cabinet B's bought.

A) $z = 6x + 9y$

B) $z = 9x + 6y$

C) $z = 9x + 13y$

D) $z = 13x + 9y$

Write a system of three inequalities that describe the constraints in the problem.

- 3) Mrs. White wants to crochet beach hats and baby afghans for a church fund-raising bazaar. She needs 5 hours to make a hat and 3 hours to make an afghan and she has 49 hours available. She wants to make no more than 13 items and no more than 9 afghans. The bazaar will sell the hats for \$20 each and the afghans for \$7 each. Let x equal the number of hats made and y equal the number of afghans made.

A) $3x + 5y \leq 49, x + y \leq 13, y \leq 9$

B) $20y + 7x \leq 49, x + y \leq 13, y \leq 9$

C) $20x + 7y \leq 49, x + y \leq 13, y \leq 9$

D) $5x + 3y \leq 49, x + y \leq 13, y \leq 9$

Write a system of two inequalities that describe the constraints in the problem.

- 4) An office manager needs to buy new filing cabinets. Cabinet A costs \$4, takes up 5 square feet of floor space, and holds 7 cubic feet of files. Cabinet B costs \$12, takes up 8 square feet, and holds 12 cubic feet. He has only \$84 to spend and the office has room for no more than 70 square feet of cabinets. Let x equal the number of cabinet A's bought and y equal the number of cabinet B's bought.

A) $7y + 12x \leq 70, 70y + 84x \leq 8$

B) $4y + 12x \leq 84, 5y + 8x \leq 70$

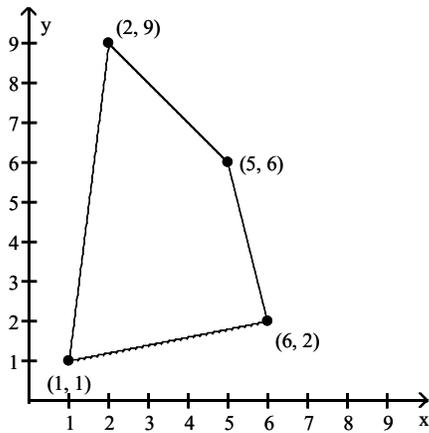
C) $7x + 12y \leq 70, 70x + 84y \leq 8$

D) $4x + 12y \leq 84, 5x + 8y \leq 70$

Find the value of the objective function at each corner of the graphed region. What is the maximum value of the objective function? What is the minimum value of the objective function?

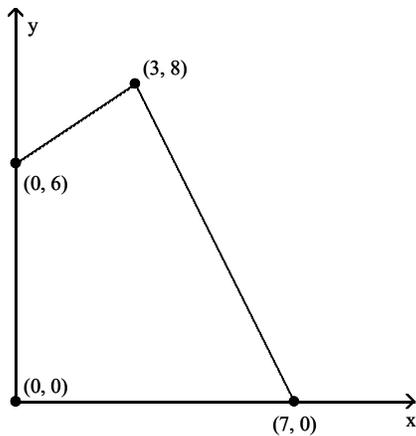
5) Objective Function

$$z = 4x + 6y$$



6) Objective Function

$$z = 60x + 80y$$



Use the two steps for solving a linear programming problem to solve the problem.

- 7) Mrs. White wants to crochet beach hats and baby afghans for a church fund-raising bazaar. She needs 8 hours to make a hat and 3 hours to make an afghan and she has 54 hours available. She wants to make no more than 13 items and no more than 11 afghans. The bazaar will sell the hats for \$19 each and the afghans for \$11 each. How many of each should she make to maximize the income for the bazaar?
- 8) An office manager needs to buy new filing cabinets. Cabinet A costs \$4, takes up 7 square feet of floor space, and holds 10 cubic feet of files. Cabinet B costs \$8, takes up 9 square feet, and holds 12 cubic feet. He has only \$48 to spend and the office has room for no more than 69 square feet of cabinets. How many of each can he buy to maximize storage capacity?