

Linear Programming = used to find the best value (max or min)
Inequalities = Constraints
Overlapped Shading = feasible region
Equation = objective function

1. A small company produces knitted blankets and sweaters and sells them through a chain of specialty stores. The company is to supply the stores with a total of no more than 100 blankets and sweaters per day. The stores guarantee that they will sell at least 10 and no more than 60 blankets per day and at least 20 sweaters per day. The company makes a profit of \$10 on each blanket and a profit of \$12 on each sweater.

a. Define the variables to be used for this situation.

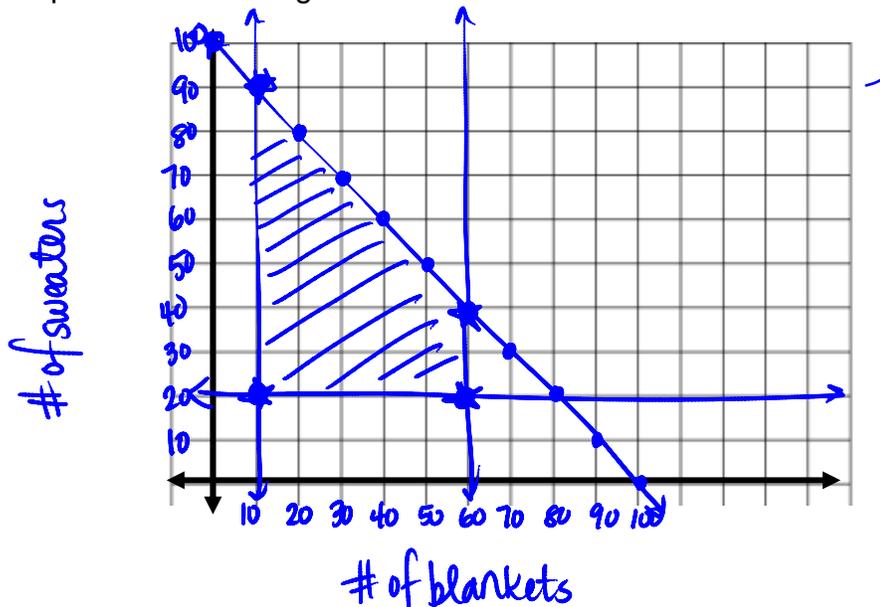
$x = \# \text{ of blankets}$ $y = \# \text{ of sweaters}$



b. Write a system of inequalities to represent the constraints.

$x + y \leq 100$
 $10 \leq x \leq 60$
 $y \geq 20$

c. Graph the feasible region.



c. Find the vertices of the feasible region.

$(10, 20)$ $(10, 90)$ $(60, 20)$ $(60, 40)$
 \$340 \$1,180 \$840 \$1,080

d. Write an objective function for the company's total profit, P, from the sale of blankets and sweaters.

$P = 10x + 12y$

f. Find the maximum profit that the company can make in a day.

The company can make a maximum profit of \$1,180 in one day by selling 10 blankets and 90 sweaters.

2. A manufacturer of refrigerators must ship at least 100 refrigerators to its two West Coast warehouses. Each warehouse holds a maximum of 100 refrigerators. Warehouse A holds 25 refrigerators already, while warehouse B has 20 on hand. It costs \$12 to ship refrigerators to warehouse A and \$10 to ship to warehouse B. How many refrigerators should be shipped to each warehouse to minimize cost? What is the minimum cost?

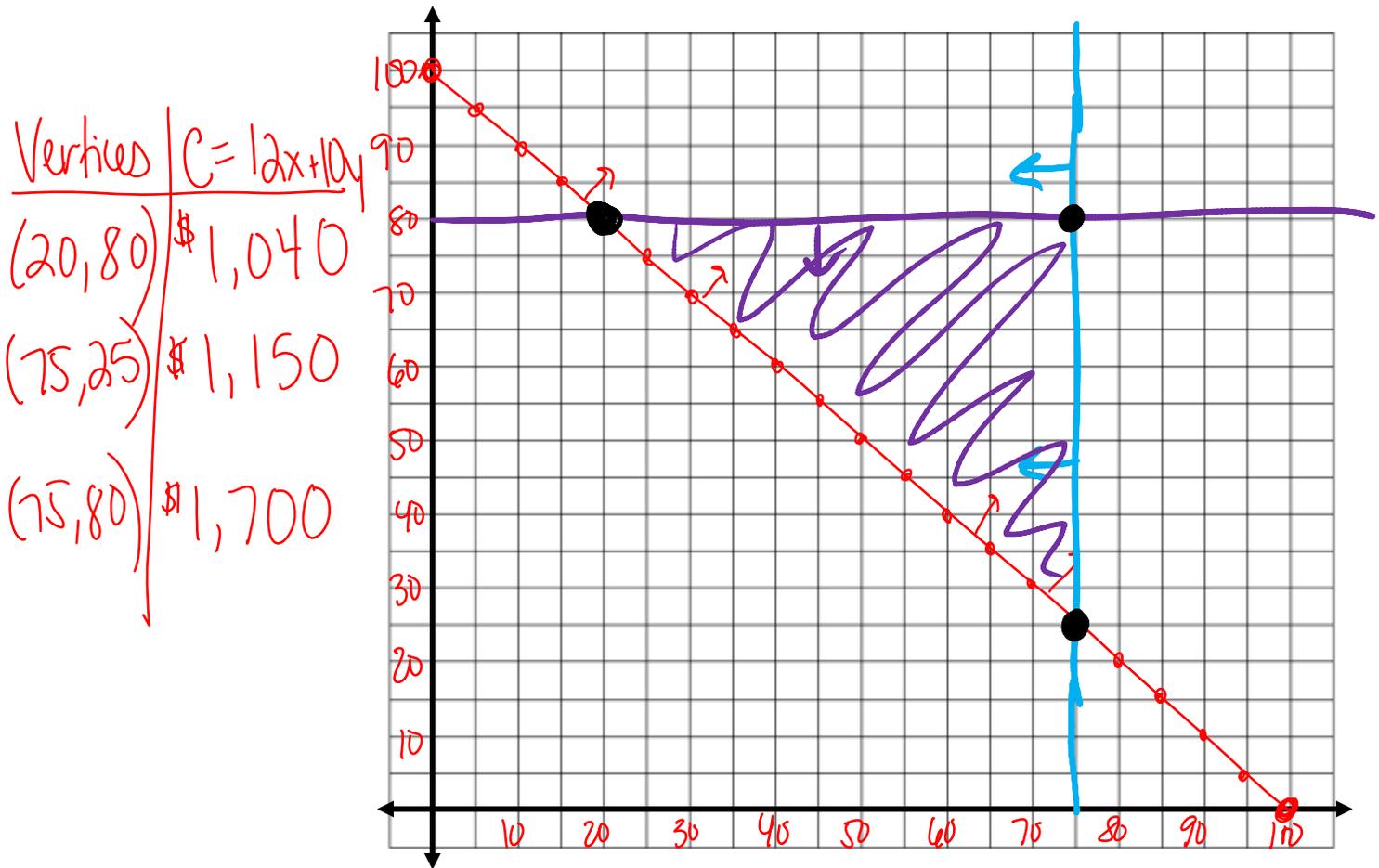
a.) Define variables
 $x =$ # of Ref. to Ware. A
 $y =$ # of Ref. to Ware. B

b.) Write system of linear inequalities
 $x + y \geq 100$
 $x \leq 75$
 $y \leq 80$



c.) Write the objective function
 $Cost = \$12x + \$10y$

d.) Graph the feasible region.
 Then label the vertices.



ANSWER THE GIVEN QUESTION(S):
 min. cost of \$1,040. by shipping 20 Ref. to Ware. A.
 and 80 Ref. to Warehouse B.

3. Earthquake victims in China need medical supplies and containers of water. Each medical kit measures 1 cubic foot and weighs 10 pounds. Each container of water is also 1 cubic foot and weighs 20 pounds. The plane can carry 80,000 pounds with a total volume of 6000 cubic feet. Each medical kit will aid 6 people, while each container of water will serve 10 people. How many of each should be sent in order to maximize the number of people aided?

a.) Define variables

$x =$ # of medical kits
 $y =$ # of cont. water

b.) Write system of linear inequalities

lbs: $10x + 20y \leq 80,000$
 volume: $x + y \leq 6,000$
 $x \geq 0, y \geq 0$

$x\text{-int: } 8,000$
 $y\text{-int: } 4,000$

c.) Write the objective function

people : $6x + 10y$
 served

d.) Graph the feasible region.

Then label the vertices.

