Linear Programming
Practice WS #3

Name Baxter

Level C

A grocer buys cases of almonds and walnuts. Almonds are packaged 20 bags per case and walnuts are packaged 25 bags per case. The grocer pays $40 per case of almonds and $25 per case of walnuts. The grocer orders no more than 300 bags of almonds and walnuts together and will pay no more than $400.

The profit on each case of almonds is $17 and the profit on each case of walnuts is $15.

a. Identify the variables:

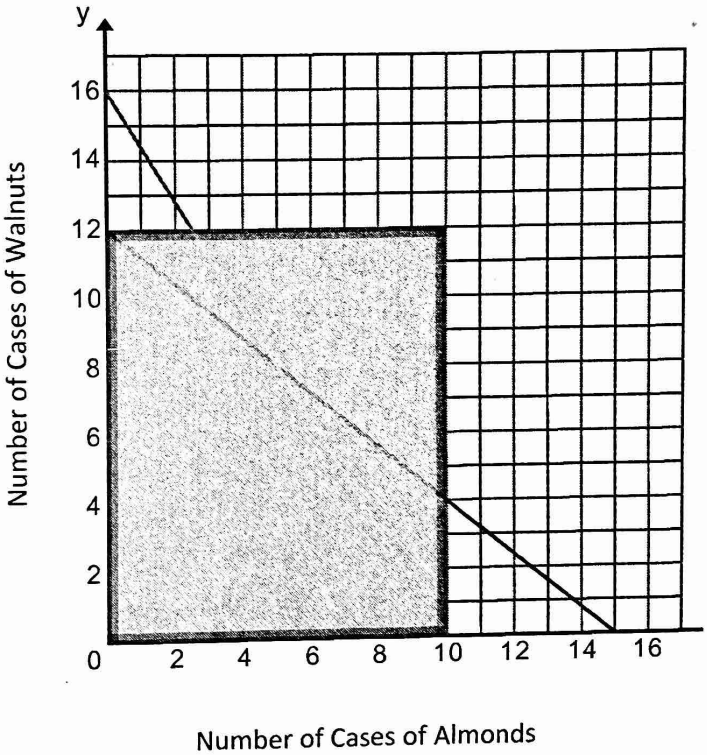
x = # of Almonds
y = # of walnuts

b. Write an objective function for the profit:

P = 17x + 15y

c. List the vertices and find the profit

Vertex	Profit
(0,0)	0
(10,0)	170
(10,12)	180
(5,8)	205



Constraints:

Bags: $20x + 25y \leq 300$

Cost: $40x + 25y \leq 400$

d. Make a recommendation for the grocer (how many cases of each should he purchase and what is his maximum profit)

5 cases of almonds and 8 cases of walnuts for profit of $205

Level B

Some students make necklaces and bracelets in their spare time and sell all that they make. Every week they have available 10,000 grams of metal and 1200 minutes of work. It takes 100 grams of metal to make a necklace and 200 grams to make a bracelet. Each necklace takes 30 minutes to make and each bracelet takes 15 minutes to make. The profit on each necklace is $3.50 and the profit on each bracelet is $2.50.

a. Define the variables

x = # necklaces

y = # bracelets

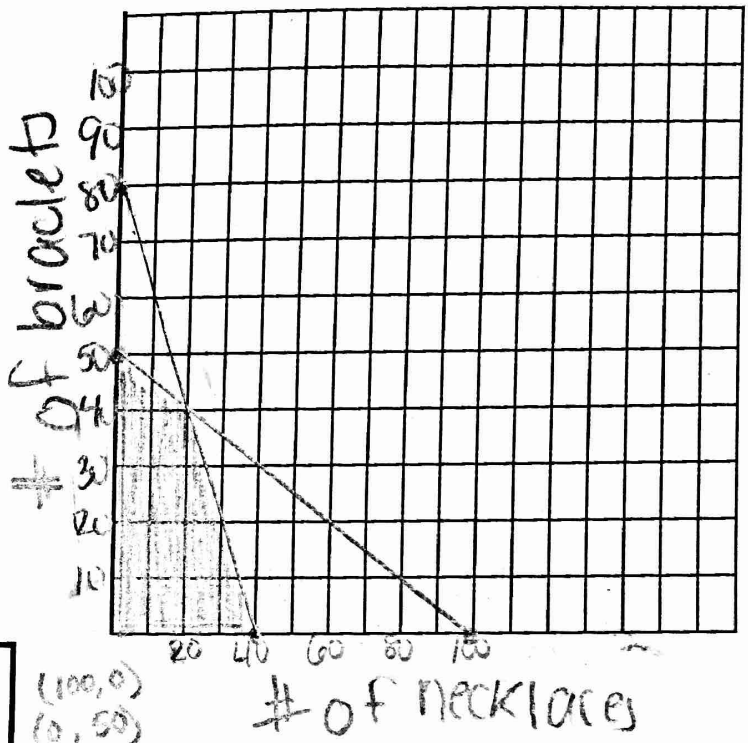
b. Write the objective function used to maximize the profit

$P = 3.50x + 2.50y$

c. Constraints

Amount of Metal: $10000 \geq 100x + 200y$

Time: $1200 \geq 30x + 15y$



d. Graph the constraints and shade the feasible region.

e. List the vertices and find the profit for each vertex

Vertex	Profit
(0,0)	0
(40,0)	140
(0,50)	125
(20,40)	170

f. Make a recommendation (how many of each type should be made and what is the maximum profit)

20 necklaces and 40 braclets for a profit of $170

Level A

A calculator company produces a scientific calculator and a graphing calculator. Long term projections indicate an expected demand of at least 100 scientific and 80 graphing calculators each day. Because of limitations on production capacity, no more than 200 scientific and 170 graphing calculators can be made daily. To satisfy a shipping contract, a total of at least 200 calculators must be shipped each day.

If each scientific calculator sold results in a $2 loss, but each graphing calculator produces a $5 profit, how many of each type should be made daily to maximize profits?

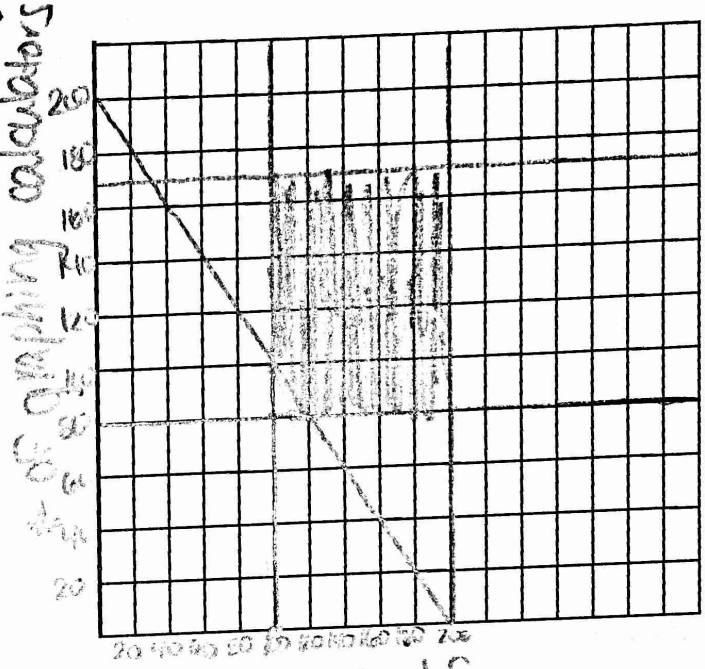
X - # of Scientific Calculators
Y - # of graphing Calculators

$x \geq 100 \quad x \leq 200$

$y \geq 80 \quad y \leq 170$

$x + y \geq 200$

$P = -2x + 5y$



(170, 80) 160
(200, 80) 0
(200, 170) 450
(100, 170) 650
(100, 100) 300

100 Scientific calculators and 170 graphing calculators for a profit of $650