

Linear Programming (cont.)

Step I translating English to math (cont.)

Example 5 Farmer Blue has 100 acres available to plant white and yellow corn. Each acre of white corn will yield 95 bushels of corn, and each acre of yellow corn will yield 120 bushels of corn. She wants to have at least three times as many bushels of white corn as she does of yellow corn. The white corn will sell for \$4 per bushel, and the yellow corn will sell for \$3.50 per bushel. How many acres of each type of corn should Farmer blue plant to maximize her revenue?

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Define variables

Let $x =$ # of acres of white corn

Let $y =$ # of acres of yellow corn

Objective Function

Maximize Revenue = $4(95x) + 3.5(120y)$

Constraints

$95x \geq 3(120y)$

$x \geq 0$

$y \geq 0$

STEP II

- Graph the constraints
- Shade the Feasible Region
- Find all corner points of the Feasible Region (points of intersection)

Example 1 Kubota Corporation supplies its tractor CA35 to the distributors located in St. Louis and Minneapolis. The St. Louis distributor needs at least 100 of the CA35 tractors next month, while the Minneapolis distributor needs at least 50. At most 200 of the CA35 tractors can be manufactured and delivered to the distributors. If it costs \$30 to ship each tractor to the St. Louis distributor, and \$40 to the Minneapolis distributor, find the number to be shipped to each distributor which minimizes the cost.

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Define the variables $\left\{ \begin{array}{l} \text{Let } x \text{ be the \# of tractors to be shipped to STL} \\ \text{Let } y \text{ be " " " Minneapolis} \end{array} \right.$

Objective Function (minimize) $cost = 30x + 40y$

Constraints

$x \geq 100$

$y \geq 50$

$x + y = 200$

$x \geq 0$

$y \geq 0$

x-intercept

$\Rightarrow 13$

y-intercept

1

$$y \geq 0$$

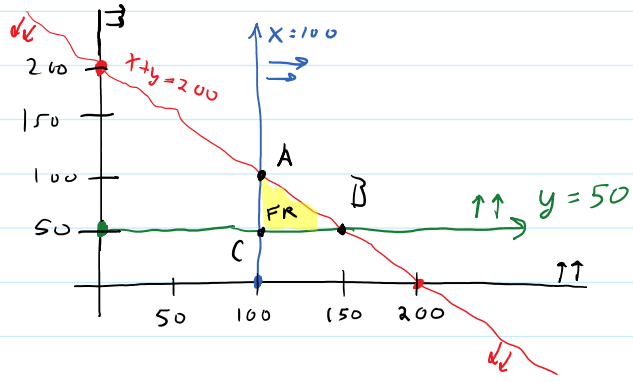
x-intercept | y-intercept

Corner Points of FR

A (100, 100)

B (150, 50)

C (100, 50)



Find A

$x = 100$

$x + y = 200$

$100 + y = 200$

$y = 100$

Find B

$x + y = 200$

$y = 50$

$x + 50 = 200$

$x = 150$