

16 oz in a lb

Linear Programming

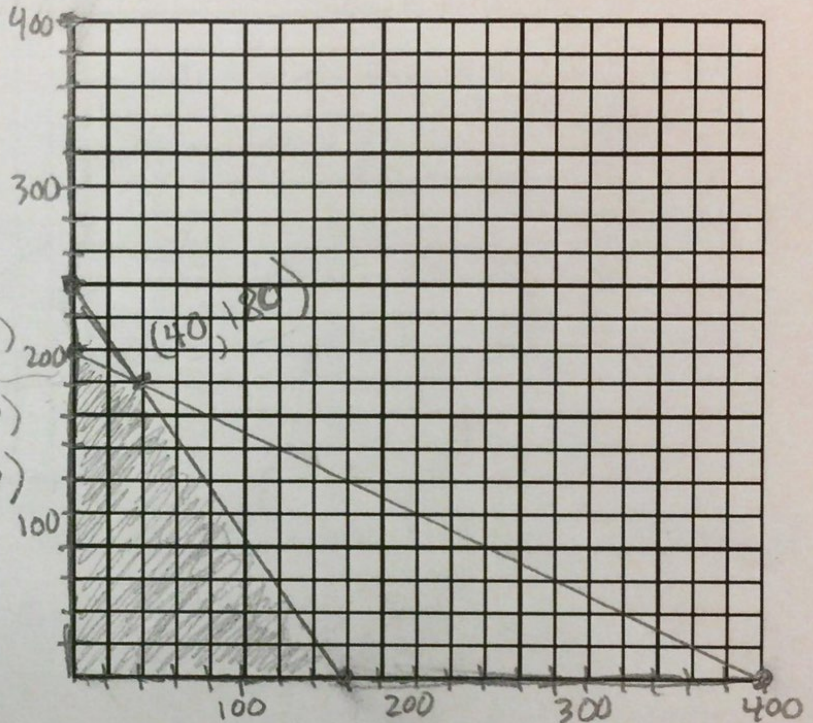
A coffee company has two coffees with which to package mixtures. The low-grade mixture contains ~~4~~^{0.25} ounces of Colombian coffee and ~~12~~^{0.75} ounces of "special blend" coffee while the high-grade mixture contains ~~8~~^{0.5} ounces of Colombian coffee and ~~8~~ ounces of "special blend" coffee. The company has ~~120~~ pounds of "special blend" and ~~100~~ pound of Colombian coffee with which to package. If the low-grade mixture profits \$0.30 per package and the high-grade mixture profits \$0.40 per package, how many packages should be prepared in order to maximize profit?

Step 1) Assign variables and write the objective function

$x = \text{low-grade}$ $y = \text{high-grade}$
 $P = 0.3x + 0.4y$

Step 2) Write the constraints and graph each of them

$0.25x + 0.5y \leq 100$ $(400, 0)$ $(0, 200)$
 $0.75x + 0.5y \leq 120$ $(160, 0)$ $(0, 240)$



Step 3) What are the corner points?

$(0, 200)$, $(40, 180)$, $(160, 0)$

Step 4) Substitute the corner points into your objective function, and report the desired result.

$P = 0.3x + 0.4y$

$(0, 200) = 0.3 \cdot 0 + 0.4 \cdot 200 = 80$

$(40, 180) = 0.3 \cdot 40 + 0.4 \cdot 180 = 84$

$(160, 0) = 0.3 \cdot 160 + 0.4 \cdot 0 = 48$

40 lbs low-grade
180 lbs high-grade

An appliance store manager is ordering chest and upright freezers. One chest freezer costs \$250 and delivers a \$40 profit. One upright freezer costs \$400 and delivers a \$60 profit. Based on previous sales, the manager expects to sell at least 100 freezers. Total profit must be at least \$4800. Find the least number of each type of freezer the manager should order to minimize costs

Step 1) Assign variables and write the objective function

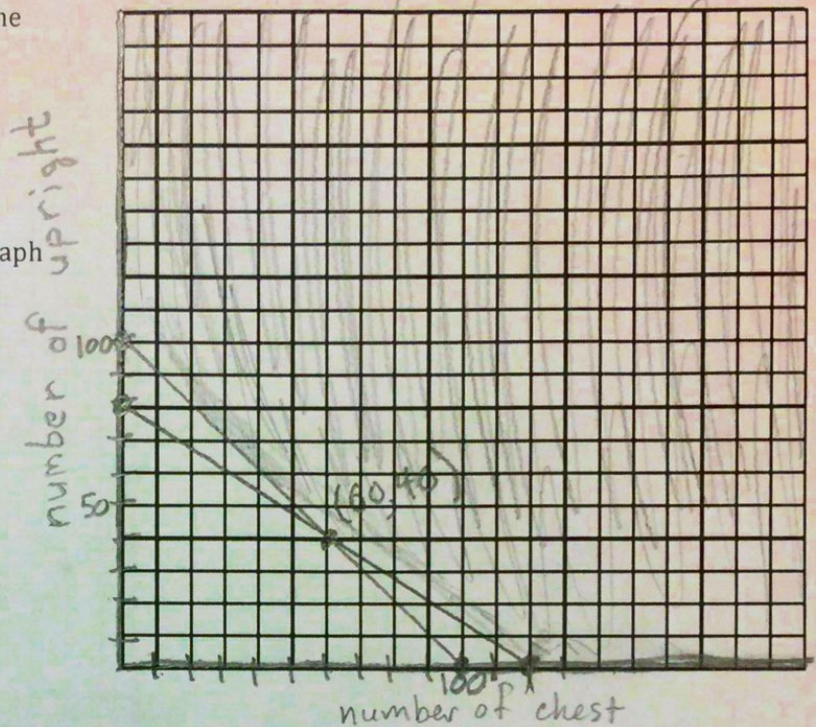
$x =$ number of chest

$y =$ number of upright
 $C = 250x + 400y$

Step 2) Write the constraints and graph each of them

$$40x + 60y \geq 4800$$

$$x + y \geq 100$$



Step 3) What are the corner points?

$(0, 100)$, $(60, 40)$, $(120, 0)$

Step 4) Substitute the corner points into your objective function, and report the desired result.

$$C = 250x + 400y$$

$$(0, 100): C = 250 \cdot 0 + 400 \cdot 100 = \$40,000$$

$$(60, 40): C = 250 \cdot 60 + 400 \cdot 40 = \$31,000$$

$$(120, 0): C = 250 \cdot 120 + 400 \cdot 0 = \$30,000$$

minimize cost at 120 chest and 0 upright freezers