

Application Problems - Linear Programming

1. Lois makes banana bread and nut bread to sell at a bazaar. A loaf of banana bread requires 2 cups of flour and 2 eggs. A loaf of nut bread takes 3 cups of flour and 1 egg. Lois has 12 cups of flour and 8 eggs on hand. She makes \$2 profit per loaf of banana bread and \$2 per loaf of nut bread. To maximize profits, how many loaves of each type should she bake?

3 banana, 2 nut

2. A tray of corn muffins requires 4 cups of milk and 3 cups wheat flour. A tray of bran muffins takes 2 cups of milk and 3 cups of wheat flour. There are 16 cups of milk and 15 cups of wheat flour available, and the baker makes \$3 profit per tray of corn muffins and \$2 per tray of bran muffins. How many trays of each should he make in order to maximize profits?

3 corn; 2 bran

3. Juan makes two types of wood clocks to sell at local stores. It takes him 2 hours to assemble a pine clock, which requires 1 oz of varnish. It takes 2 hours to assemble an oak clock, which takes 4 oz of varnish. Juan has 16 oz of varnish in stock and he can work 20 hours. If he makes \$3 profit on each pine clock and \$4 on each oak clock, how many of each type should he make to maximize his profits?

8 Pine; 2 oak

4. Kay grows and sells tomatoes and green beans. It costs \$1 to grow bushel of tomatoes, and it takes 1 yd² of land. It costs \$3 to grow a bushel of beans, and it takes 6 yd² of land. Kay's budget is \$15, and she has 24 yd² of land available. If she makes \$1 profit on each bushel of tomatoes and \$4 profit on each bushel of beans, how many bushels of each should she grow in order to maximize profits?

6 tomato
3 green bean

$$\begin{aligned} x &\geq 0 & (0,0) &= 0 \\ y &\geq 0 & (0,4) &= 8 \\ 2x + 3y &\leq 12 & (3,2) &= 10 \text{ Max} \\ 2x + 1y &\leq 8 & (4,0) &= 8 \end{aligned}$$

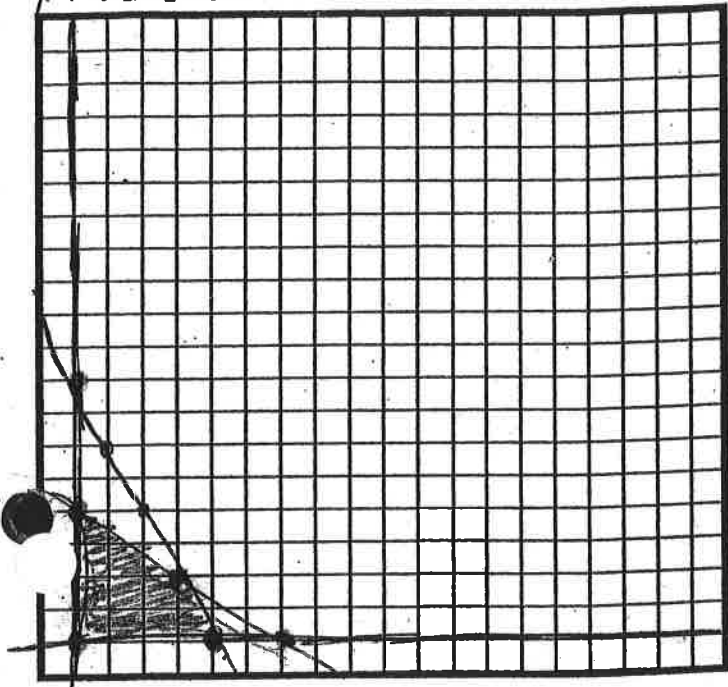
$$\begin{aligned} x &\geq 0 & (0,0) &= 0 \\ y &\geq 0 & (4,0) &= 12 \\ 4x + 2y &\leq 16 & (0,5) &= 10 \\ 3x + 3y &\leq 15 & (3,2) &= 13 \text{ Max} \end{aligned}$$

$$\begin{aligned} x &\geq 0 & (0,0) &= 0 \\ y &\geq 0 & (0,4) &= 16 \\ 2x + 2y &\leq 20 & (10,0) &= 90 \\ 1x + 4y &\leq 16 & (8,2) &= 32 \text{ Max} \end{aligned}$$

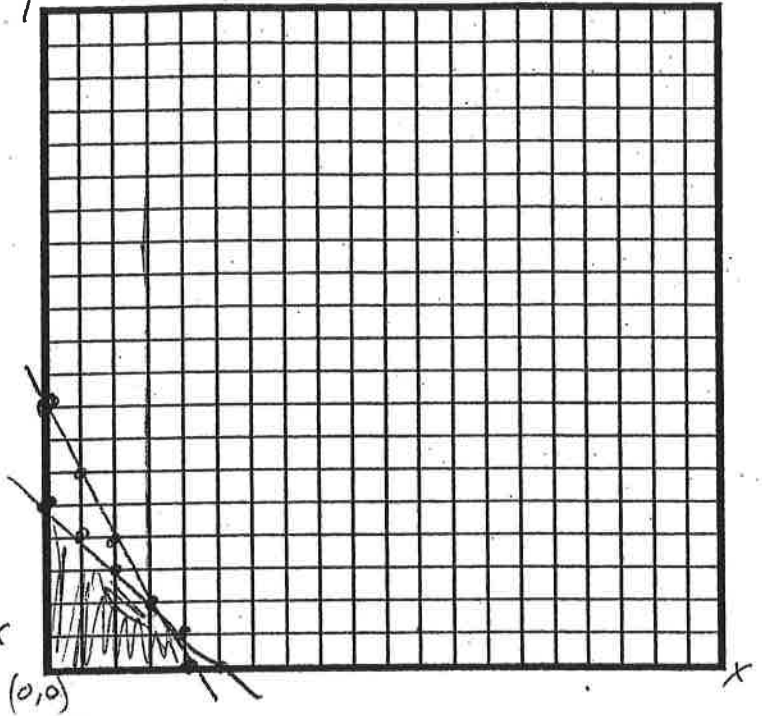
$$\begin{aligned} x &\geq 0 & (0,0) &= 0 \\ y &\geq 0 & (15,0) &= 15 \\ 1x + 3y &\leq 15 & (0,4) &= 16 \\ 1x + 6y &\leq 24 & (6,3) &= 18 \text{ Max} \end{aligned}$$

Key

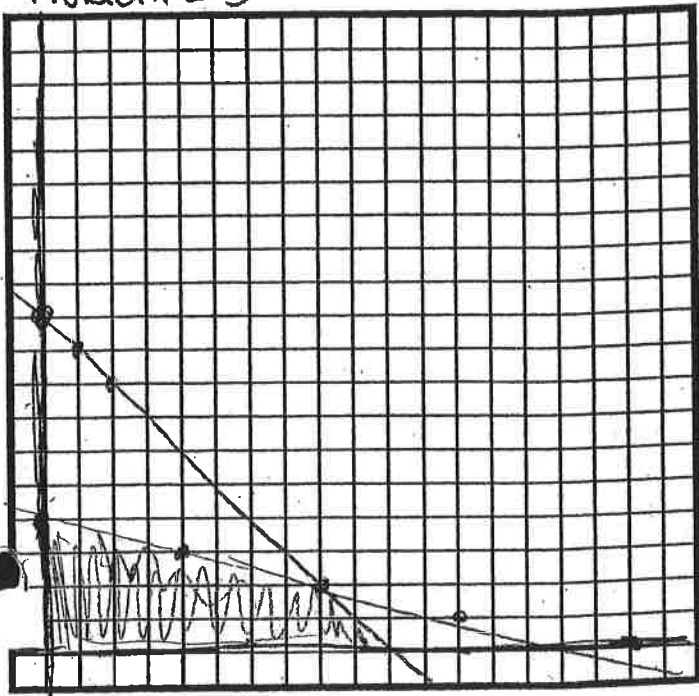
x Problem #1



y Problem #2



Problem #3



Problem #4

