

Example 2:

A store has requested a manufacturer to produce pants and sports jackets.

For materials, the manufacturer has 750 m² of cotton textile and 1,000 m² of polyester. Every pair of pants (1 unit) needs 1 m² of cotton and 2 m² of polyester. Every jacket needs 1.5 m² of cotton and 1 m² of polyester.

The price of the pants is fixed at 50 and the jacket, 40. What is the number of pants and jackets that the manufacturer must give to the stores so that these items obtain a maximum sale?

Formalization and solution in Python:

- Define objective function, decision variables, constraints (cTx, A, b)
- Print the values for cTx, A, b on screen
- Print the constraints and the feasible region as a plot
- Print the graphical solution as a plot (max function)

cotton 750 m²
polyester 1000 m²

pants → cotton 1 m² cost 50
 polyester 2 m²

jacket → cotton 1.5 m² cost 40
 polyester 1 m²

How many? How many? Pants? Jacket? } **variables**

Decision x = number pants
 y = number jacket

↓
function
 $f(x,y) = 50x + 40y$ **objective function**

① cotton $1x + 1.5y \leq 750$ } **constraints**
② polyester $2x + 1y \leq 1000$ } **constraints**

$$\textcircled{1} \quad 1x + 1.5y \leq 750$$

↓ x2 by 2

$$2x + 3y \leq 1500$$

$$\text{particular } x \text{ if } y = 0$$

$$\text{particular } y \text{ if } x = 0$$

$$\begin{aligned} \text{particular } x \quad y=0 \quad 2x+3y &= 1500 \\ 2x+3(0) &= 1500 \\ x &= 750 \end{aligned}$$

$$\begin{aligned} \text{particular } y \quad x=0 \quad 2x+3y &= 1500 \\ 2(0)+3y &= 1500 \\ y &= 500 \end{aligned}$$

part ① (750, 0), (0, 500)

$$\textcircled{2} \quad 2x + y \leq 1000$$

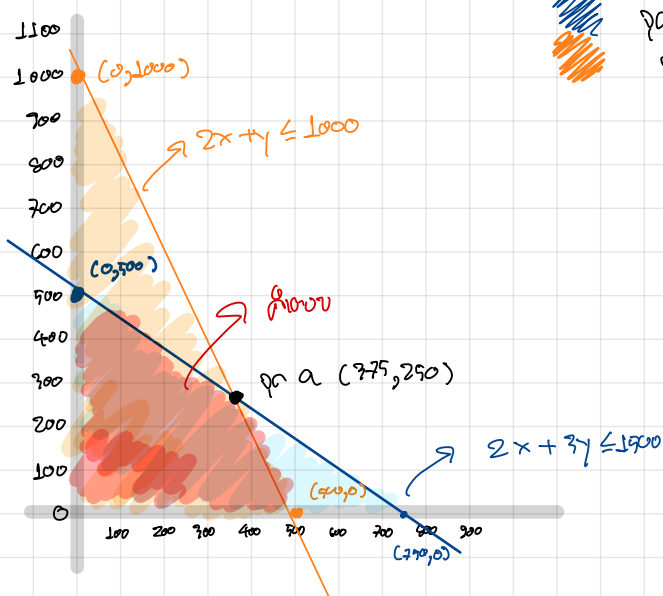
$$\begin{aligned} \text{particular } x \quad y=0 \quad 2x+y &= 1000 \\ 2x &= 1000 \\ x &= 500 \\ (500, 0) \end{aligned}$$

$$\begin{aligned} \text{particular } y \quad x=0 \quad 2x+y &= 1000 \\ 2(0)+y &= 1000 \\ y &= 1000 \\ (0, 1000) \end{aligned}$$

part ② (500, 0) & (0, 1000)

$$x \quad 750, 500$$

$$y \quad 500, 1000$$



၂၀၁၈ ၁) $(750, 0)$, $(0, 500)$
 ၂၀၁၈ ၂) $(500, 0)$ နှင့် $(0, 1000)$

၂၀၁၉ = ?

① $2x + 3y = 1500$

② $2x + y = 1000$

① - ② $2y = 500$
 $y = 250$

၆၈၆၆ $y = 250$ ၇၆ ②

$2x + y = 1000$

$2x + 250 = 1000$

$2x = 750$

$x = 375$

$a = (375, 250)$

$f(x, y) = 50x + 40y$
 ၁ $(0, 0) = 50(0) + 40(0) = 0$
 ၂ $(0, 500) = 50(0) + 40(500) = 20,000$
 ၃ $(375, 250) = 50(375) + 40(250) = 18,750 + 10,000 = 28,750$
 ၄ $(500, 0) = 50(500) + 40(0) = 25,000$

$x = 375$

$y = 250$

စီမံကိန်း ပြုလုပ်ပုံ အကဲဖြတ်ချက် ၃၇၅ ဝပ်

၆၈၆၆ စီမံကိန်း ပြုလုပ်ပုံ အကဲဖြတ်ချက် ၂၅၀ ဝပ်

① $2x + 3y = 1500$

② $2x + y = 1000$

② $2x + y = 1000$

$y = 1000 - 2x$

$y = -2x + 1000$

$y = mx + c$

① $2x + 3y = 1500$

$3y = 1500 - 2x$

$y = \frac{1500 - 2x}{3}$

$y = \frac{1500}{3} - \frac{2x}{3}$

$y = -\frac{2}{3}x + 500$

$3y = 1500 - 2x$

$\downarrow \div 3$

$\frac{3y}{3} = \frac{1500 - 2x}{3}$

$y = \frac{1500 - 2x}{3}$

$= \frac{1500}{3} - \frac{2x}{3}$

$= 500 - \frac{2}{3}x$

$y = -\frac{2}{3}x + 500$

$\frac{1500}{3} - \frac{2x}{3} = \frac{1500 - 2x}{3}$