

# Pre-Calculus and Calculus

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# 1 Lineal Programming

Notes about Lineal Programming!

## 1.1 What is it?

Lineal programming is a way to find the best outcome (maximum or minimum) represented by linear relationships.

## 1.2 Example Problems

**Problem 1** *A factory has 2 products A and B. The profit for each product is \$20 and \$30 respectively. The factory has 2 machines, machine 1 and machine 2. Machine 1 has a maximum time of production of 800 hours and Machine 2 has a maximum production time of 600 hours. Product A needs 2 hours in Machine 1 and 1 hour in Machine 2. Product B requires 1 hour in Machine 1 and 3 hours in Machine 2. How many products of each type should be produced to maximize the profit?*

$$\text{Maximize } 20A + 30B$$

$$\text{Subject to } 2A + B \leq 800 \quad (1)$$

$$A + 3B \leq 600$$

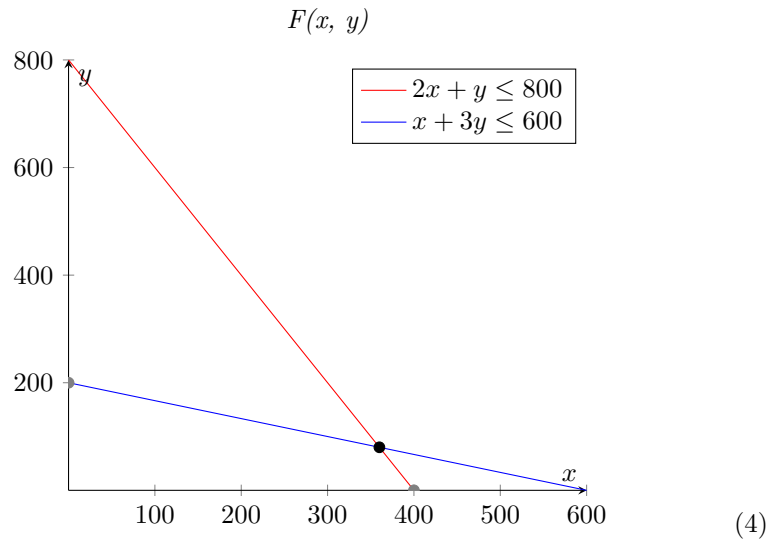
$$A, B \geq 0$$

$$\text{The function } F(A, B) = 20A + 30B \quad (2)$$

$$\text{Can be represented as } F(x, y) = 20x + 30y$$

	<i>A</i>	<i>B</i>	<i>Max</i>
<i>Machine 1</i>	<i>2</i>	<i>1</i>	<i>800h</i>
<i>Machine 2</i>	<i>1</i>	<i>3</i>	<i>600h</i>
<i>Price</i>	<i>\$20</i>	<i>\$30</i>	

(3)



$x$	$y$	$F(x, y)$
0	200	6000
400	0	8000
360	80	9600

(5)

Using the function  $F(A, B) = 20A + 30B$

$$F(x, y) = 20x + 30y \quad (6)$$

$$F(360, 80) = 20(360) + 30(80)$$

$$F(360, 80) = 9600$$

The maximum of the function is at the point (360, 80) (7)