

Exercise -2-

Using the graphical method, solve each of the following LPP

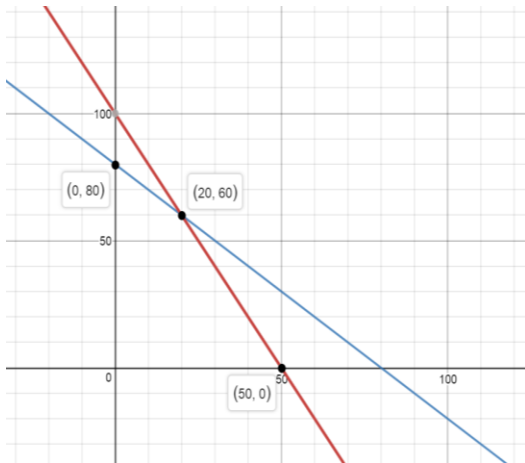
1- $\text{Max } Z = 50X_1 + 18X_2$

Subject to

$$2X_1 + X_2 \leq 100$$

$$X_1 + X_2 \leq 80$$

$$X_1 \geq 0, X_2 \geq 0$$



(X_1, X_2)	Z
(0,80)	1440
(20,60)	2080
(50,0)	2500

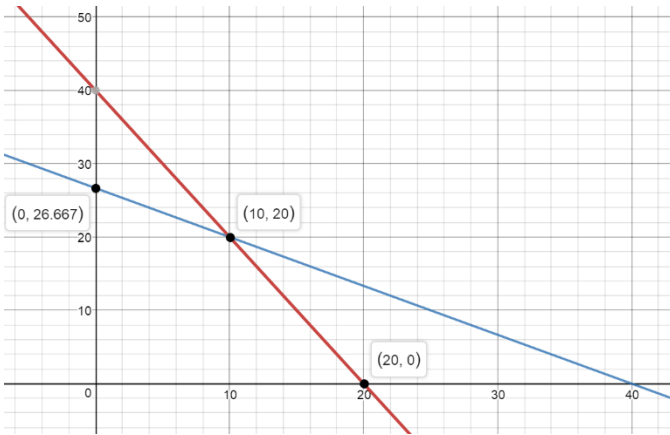
2- $\text{Max } Z = 10X_1 + 8X_2$

Subject to

$$2X_1 + X_2 \leq 40$$

$$2X_1 + 3X_2 \leq 80$$

$$X_1 \geq 0, X_2 \geq 0$$



(X_1, X_2)	Z
$(0, 26.667)$	213.33
$(10, 20)$	260
$(20, 0)$	200

3- $\text{Max } Z = 300X_1 + 400X_2$

Subject to

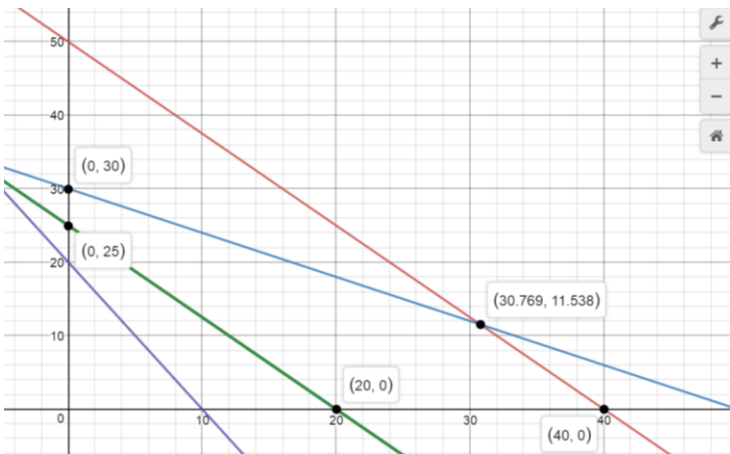
$$5X_1 + 4X_2 \leq 200$$

$$3X_1 + 5X_2 \leq 150$$

$$5X_1 + 4X_2 \geq 100$$

$$8X_1 + 4X_2 \geq 80$$

$$X_1 \geq 0, X_2 \geq 0$$



(X_1, X_2)	Z
(0,25)	10000
(0,30)	12000
(30.769,11.538)	13846.1
(40,0)	6000
(20,0)	12000

Range of optimality

$$240 \leq C_1 \leq 500$$

$$240 \leq C_2 \leq 500$$

$$4- \text{Min } Z = 120X_1 + 100X_2$$

Subject to

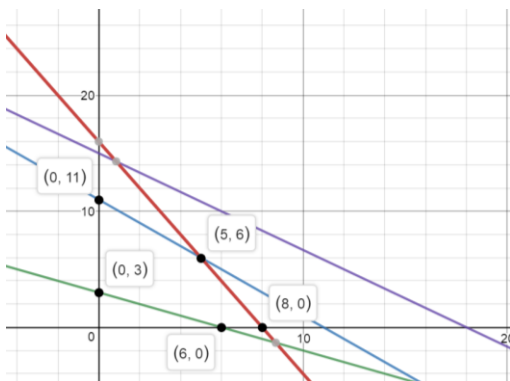
$$10X_1 + 5X_2 \leq 80$$

$$6X_1 + 6X_2 \leq 66$$

$$4X_1 + 8X_2 \geq 24$$

$$5X_1 + 6X_2 \leq 90$$

$$X_1 \geq 0, X_2 \geq 0$$



(X_1, X_2)	Z
(0,3)	300
(0,11)	1100
(5,6)	1200
(8,0)	960
(6,0)	720

5- $\text{Min } Z = 20X_1 + 40X_2$

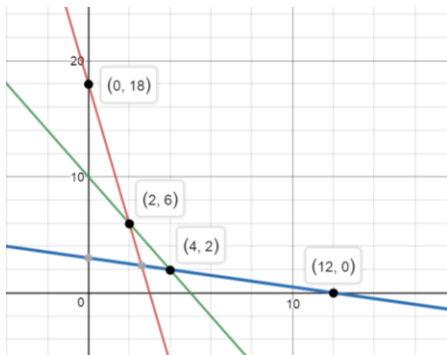
Subject to

$$36X_1 + 6X_2 \geq 108$$

$$3X_1 + 12X_2 \geq 36$$

$$200X_1 + 100X_2 \geq 1000$$

$$X_1 \geq 0, X_2 \geq 0$$



(X_1, X_2)	Z
(0,18)	720
(2,6)	280
(4,2)	160
(12,0)	240

Range of optimality

$$10 \leq C_1 \leq 80$$

$$10 \leq C_2 \leq 80$$