

Assignment-1

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1

$$|1| = 1 > 0$$

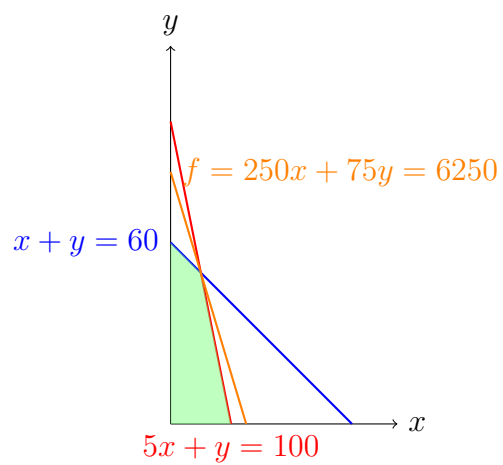
$$\begin{vmatrix} 1 & \alpha \\ \alpha & 4 \end{vmatrix} = 4 - \alpha^2 > 0, \alpha \in (-2, 2)$$

$$\begin{aligned} \begin{vmatrix} 1 & \alpha & -1 \\ \alpha & 4 & 2 \\ -1 & 2 & 4 \end{vmatrix} &= 1 \times 4 \times 4 + (-1) \times 2\alpha + (-1) \times 2\alpha \\ &\quad - (-1) \times 4 \times (-1) - 4\alpha^2 - 1 \times 2 \times 2 \\ &= -4\alpha^2 - 4\alpha + 8 \\ &= -4(\alpha^2 + \alpha - 2) > 0, \alpha \in (-2, 1) \end{aligned}$$

$$\therefore \alpha \in (-2, 1)$$

2

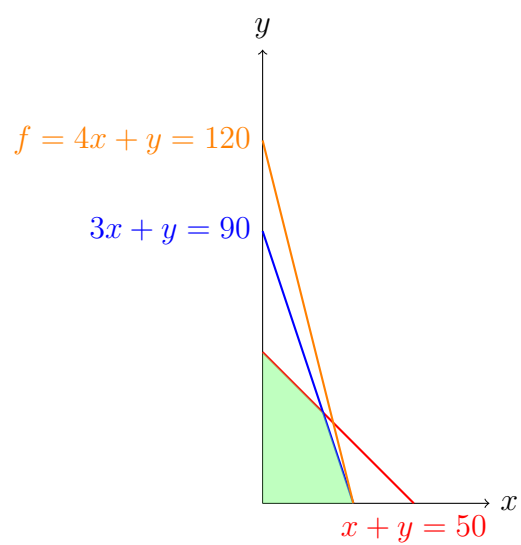
(a)



$$x = 10, y = 50,$$

$$\begin{aligned}\max f &= 250 \times 10 + 75 \times 50 \\ &= 6250\end{aligned}$$

(b)



$$x = 30, y = 0,$$

$$\begin{aligned}\max f &= 4 \times 30 + 0 \\ &= 120\end{aligned}$$

3

4