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جامعة المنوفية، كلية الهندسة الالكترونية

قسم هندسة الالكترونيات الصناعية والتحكم

Exercise 1

1.1

$$\begin{aligned}&\text{Maximize } F(x_1, x_2) = x_1 + 2x_2\\&\text{subject to } 2x_1 + x_2 \leq 4\\&\qquad x_1, x_2 \geq 0\end{aligned}$$

1.2

$$\begin{aligned}&\text{Minimize } f(x_1, x_2) = x_1 + 3x_2\\&\text{subject to } x_1 + 4x_2 \geq 48\\&\qquad 5x_1 + x_2 \geq 50\\&\qquad x_1, x_2 \geq 0\end{aligned}$$

1.3

$$\begin{aligned}&\text{Minimize } f(x_1, x_2) = 5x_1 + 10x_2\\&\text{subject to } 10x_1 + 5x_2 \leq 50\\&\qquad 5x_1 - 5x_2 \geq -20\\&\qquad x_1, x_2 \geq 0\end{aligned}$$

1.4

$$\begin{aligned}&\text{Minimize } f(x_1, x_2) = 3x_1 + x_2\\&\text{subject to } 2x_1 + 4x_2 \leq 21\\&\qquad 5x_1 + 3x_2 \leq 18\\&\qquad x_1, x_2 \geq 0\end{aligned}$$

1.5

$$\begin{aligned}&\text{Minimize } f(x_1, x_2) = 3x_1 + 6x_2\\&\text{subject to } -3x_1 + 3x_2 \leq 2\\&\qquad 4x_1 + 2x_2 \leq 4\\&\qquad -x_1 + 3x_2 \geq 1\end{aligned}$$

1.6

$$Maximize\ f(x_1, x_2) = 50x_1 + 40x_2$$

$$\text{Subject to} \quad 2x_1 + 4x_2 \leq 8$$

$$x_1 + 2x_2 \leq 4$$

$$x_1, x_2 \geq 0$$

1.7 A factory manufactures two machines A and B. The maximum number of machines that can be manufactured daily is 20. The shipping facility can handle no more than 14 machines per day. If the prices of machines A and B are L.E. 3000 and L.E. 5500, respectively. How many A and B machines should the company manufacture every day to maximize its profit?

1.8 A trucking company wants to purchase two new trucks. It has $3 million to spend. The prices of the two kinds of trucks are $30 thousands and $50 thousands. There are some limitations on the operations that need to be considered. The company can hire at most 50 truck drivers. Garage and maintenance facilities can handle at the most 25 trucks. How many trucks of each type should the company purchase?