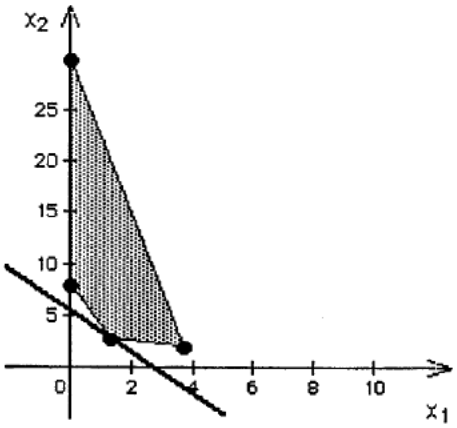
題號 3.4-8 (a) (b)

3.4-8.

(a) minimize $C = 8S + 4P$

subject to
$$\begin{aligned} 5S + 15P &\geq 50 \\ 20S + 5P &\geq 40 \\ 15S + 2P &\leq 60 \\ S, P &\geq 0 \end{aligned}$$

(b) Optimal Solution: $(S, P) = (x_1^*, x_2^*) = (1.3, 2.9)$ and $C^* = 21.82$



題號 3.4-10(a)

3.4-10.

(a) Let f_1 = number of full-time consultants working the morning shift (8 a.m.-4 p.m.),
f_2 = number of full-time consultants working the afternoon shift (Noon-8 p.m.),
f_3 = number of full-time consultants working the evening shift (4 p.m.-midnight),
p_1 = number of part-time consultants working the first shift (8 a.m.-noon),
p_2 = number of part-time consultants working the second shift (Noon-4 p.m.),
p_3 = number of part-time consultants working the third shift (4 p.m.-8 p.m.),
p_4 = number of part-time consultants working the fourth shift (8 p.m.-midnight).

minimize $C = (40 \times 8)(f_1 + f_2 + f_3) + (30 \times 4)(p_1 + p_2 + p_3 + p_4)$

subject to
$$\begin{aligned} f_1 + p_1 &\geq 4 \\ f_1 + f_2 + p_2 &\geq 8 \\ f_2 + f_3 + p_3 &\geq 10 \\ f_3 + p_4 &\geq 6 \\ f_1 &\geq 2p_1 \\ f_1 + f_2 &\geq 2p_2 \\ f_2 + f_3 &\geq 2p_3 \\ f_3 &\geq 2p_4 \\ f_1, f_2, f_3, p_1, p_2, p_3, p_4 &\geq 0 \end{aligned}$$

題號 3.4-15 (a)

3.4-15.

(a) Let x_{ij} be the number of hours operator i is assigned to work on day j for $i = KC, DH, HB, SC, KS, NK$ and $j = M, Tu, W, Th, F$.

minimize $Z = 25(x_{KC,M} + x_{KC,W} + x_{KC,F}) + 26(x_{DH,Tu} + x_{DH,Th}) + 24(x_{HB,M} + x_{HB,Tu} + x_{HB,W} + x_{HB,F}) + 23(x_{SC,M} + x_{SC,Tu} + x_{SC,W} + x_{SC,F}) + 28(x_{KS,M} + x_{KS,W} + x_{KS,Th}) + 30(x_{NK,Th} + x_{NK,F})$

subject to

$x_{KC,M} \le 6, x_{KC,W} \le 6, x_{KC,F} \le 6$
$x_{DH,Tu} \le 6, x_{DH,Th} \le 6$
$x_{HB,M} \le 4, x_{HB,Tu} \le 8, x_{HB,W} \le 4, x_{HB,F} \le 4$
$x_{SC,M} \le 5, x_{SC,Tu} \le 5, x_{SC,W} \le 5, x_{SC,F} \le 5$
$x_{KS,M} \le 3, x_{KS,W} \le 3, x_{KS,Th} \le 8$
$x_{NK,Th} \le 6, x_{NK,F} \le 2$

$x_{KC,M} + x_{KC,W} + x_{KC,F} \ge 8$
$x_{DH,Tu} + x_{DH,Th} \ge 8$
$x_{HB,M} + x_{HB,Tu} + x_{HB,W} + x_{HB,F} \ge 8$
$x_{SC,M} + x_{SC,Tu} + x_{SC,W} + x_{SC,F} \ge 8$
$x_{KS,M} + x_{KS,W} + x_{KS,Th} \ge 7$
$x_{NK,Th} + x_{NK,F} \ge 7$

$x_{KC,M} + x_{HB,M} + x_{SC,M} + x_{KS,M} = 14$
$x_{DH,Tu} + x_{HB,Tu} + x_{SC,Tu} = 14$
$x_{KC,W} + x_{HB,W} + x_{SC,W} + x_{KS,W} = 14$
$x_{DH,Th} + x_{HB,Th} + x_{NK,Th} = 14$
$x_{KC,F} + x_{HB,F} + x_{SC,F} + x_{NK,F} = 14$

$x_{ij} \ge 0$ for all i, j.

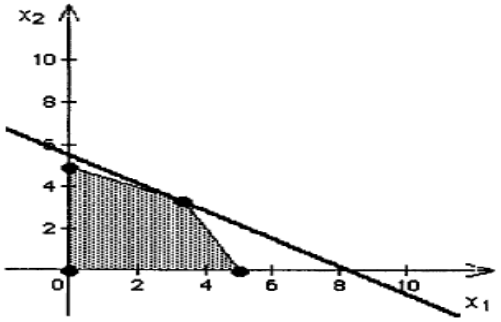
題號 3.5-2 (a) (b)

3.5-2.

(a) maximize $P = 20x_1 + 30x_2$

subject to
$$\begin{aligned} 2x_1 + \ \ x_2 &\le 10 \\ 3x_1 + \ 3x_2 &\le 20 \\ 2x_1 + \ 4x_2 &\le 20 \\ x_1, x_2 &\ge 0 \end{aligned}$$

(b) Optimal Solution: $(x_1^*, x_2^*) = \left(3\frac{1}{3}, 3\frac{1}{3}\right)$ and $P^* = 166.67$



題號 3.5-4 (a) (b)

3.5-4.

(a) minimize $C = 60x_1 + 50x_2$

subject to
$$\begin{aligned} 5x_1 + 3x_2 &\ge 60 \\ 2x_1 + 2x_2 &\ge 30 \\ 7x_1 + 9x_2 &\ge 126 \end{aligned}$$

and $x_1, x_2 \ge 0$

(b) Optimal Solution: $(x_1^*, x_2^*) = (6.75, 8.75)$ and $C^* = 842.50$