

Assignment 2

1. (a)

Let x_j = The number of full-time worker^{begin} in regular shift

Let y_j = The number of part-time worker^{begin} in regular shift

$$Z = 112(x_1 + x_2 + x_3 + x_4) + 48(y_1 + y_2 + y_3 + y_4) \quad \{\text{minimum - costing}\}$$

Subject to: 8am - noon $x_1 + y_1 \geq 4$

noon - 4pm $x_2 + x_1 + y_2 \geq 8$

4pm - 8pm $x_3 + x_2 + y_3 \geq 10$

8pm - midnight $x_4 + x_3 + y_4 \geq 6$

$$x_1 \geq y_1 \quad x_1 + x_2 \geq y_2 \quad x_2 + x_3 \geq y_3 \quad x_3 + x_4 \geq y_4$$

$$(b) \quad Z = 112(x_1 + x_2 + x_3 + x_4) + 48(y_1 + y_2 + y_3 + y_4)$$

Subject to: 8am - noon $x_1 + y_1 \geq 4$

noon - 4pm $x_2 + y_2 \geq 8$

4pm - 8pm $x_3 + y_3 \geq 10$

8pm - midnight $x_4 + y_4 \geq 6$

$$x_1 \geq y_1 \quad x_2 \geq y_2 \quad x_3 \geq y_3 \quad x_4 \geq y_4 \quad x_i, y_i \geq 0$$

$$2. \quad \text{Max } Z = 32x_1 + 24x_2$$

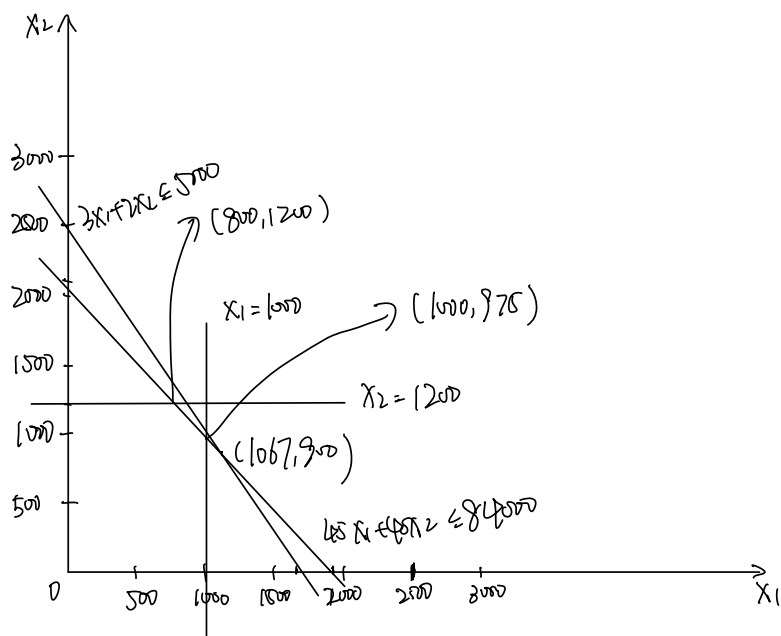
$$x_1 \leq 1000$$

$$x_2 \leq 1200$$

$$3x_1 + 2x_2 \leq 5000$$

$$4x_1 + 6x_2 \leq 9600$$

$$7x_1 + 8x_2 \leq 16800$$



$$Z_1 = 800 \times 32 + 1200 \times 24 = 54400$$

$$Z_2 = 1000 \times 32 + 975 \times 24 = 55400$$

So optimal points $X_1 = 1000$ $X_2 = 975$ $Z = 55400$

3. Let SML = amount of small, medium, large to produce

X_{iS} = amount of small product produced in plant i $i=1,2,3$

X_{iM} = amount of medium product produced in plant i $i=1,2,3$

X_{iL} = amount of large product produced in plant i $i=1,2,3$

$$S = X_{1S} + X_{2S} + X_{3S} \quad S \leq 750$$

$$M = X_{1M} + X_{2M} + X_{3M} \quad M \leq 1200$$

$$L = X_{1L} + X_{2L} + X_{3L} \quad L \leq 900$$

$$\text{max: } Z = 420L + 360M + 300S \quad 12X_{1S} + 15X_{1M} + 20X_{1L} \leq 13000$$

$$X_{1S} + X_{1M} + X_{1L} \leq 750 \quad 12X_{2S} + 15X_{2M} + 20X_{2L} \leq 12000$$

$$X_{2S} + X_{2M} + X_{2L} \leq 900 \quad 12X_{3S} + 15X_{3M} + 20X_{3L} \leq 5000$$

$$X_{3S} + X_{3M} + X_{3L} \leq 450$$