Class 4 (31.01.2017)

Use Simplex method to solve the following:

1. Maximize $Z = 2x_1 + 5x_2$, Subject to $x_1 + 4x_2 \leq 24,\ 3x_1 + x_2 \leq 21, x_1 + x_2 \leq 9, x_1, x_2 \geq 0$.

   (Ans. $x_1 = 4, x_2 = 5, Z = 33$)

2. Maximize $Z = 4x_1 + 3x_2 + 6x_3$, Subject to $2x_1 + 3x_2 + 2x_3 \leq 440,\ 4x_1 + 3x_3 \leq 470, 2x_1 + 5x_2 \leq 430, x_1, x_2, x_3 \geq 0$.

   (Ans. $x_1 = 0, x_2 = \frac{380}{9}, x_3 = \frac{470}{3}, Z = \frac{3200}{3}$)

3. Maximize $Z = 12x_1 + 15x_2 + 14x_3$, Subject to $-x_1 + x_2 \leq 0,\ -x_2 + 2x_3 \leq 0, x_1 + x_2 + x_3 \leq 100, x_1, x_2, x_3 \geq 0$.

   (Ans. $x_1 = 40, x_2 = 40, x_3 = 20, Z = 1360$)

4. Minimize $Z = x_1 - 3x_2 + 3x_3$, Subject to $3x_1 - x_2 + 2x_3 \leq 7,\ 2x_2 + 4x_2 \leq -12,\ -4x_1 + 3x_2 + 8x_3 \leq 10, x_1, x_2, x_3 \geq 0$.

   (Ans. $x_1 = \frac{31}{5}, x_2 = \frac{58}{5}, x_3 = 0, Z = -\frac{143}{5}$)

5. Maximize $Z = 3x_1 + 2x_2 + 2x_3$, Subject to $5x_1 + 7x_2 + 4x_3 \leq 7,\ 4x_1 - 7x_2 - 5x_3 \leq 2\ , 3x_1 + 4x_2 - 6x_3 \geq 3, x_1, x_2, x_3 \geq 0$.

   (Ans. $x_1 = 0, x_2 = \frac{27}{29}, x_3 = \frac{7}{58}, Z = \frac{61}{29}$)

6. Maximize $Z = x_1 + 2x_2 + 3x_3$, Subject to $x_1 - x_2 + x_3 \geq 4,\ x_1 + x_2 + 2x_3 \leq 8\ , x_1 - x_3 \geq 2, x_1, x_2, x_3 \geq 0$.

   (Ans. $x_1 = \frac{18}{5}, x_2 = \frac{6}{5}, x_3 = \frac{8}{5}, Z = \frac{54}{5}$