

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 1) By introducing suitable slack variables, formulate the following linear programming problem in terms of a system of linear equations. Maximize  $5x + 3y$  subject to the constraints:

$$\begin{cases} x + 3y \leq 6 \\ x + y \leq 4 \\ y \leq 2 \\ x \geq 0 \\ y \geq 0 \end{cases}$$

- 2) By introducing suitable slack variables, formulate the following linear programming problem in terms of a system of linear equations.

Maximize  $3x + 2y + 5z$  subject to the constraints:

$$\begin{cases} 4x - 7z \leq 40 \\ x + y + 6z \leq 80 \\ x \geq 0, y \geq 0, z \geq 0 \end{cases}$$

Write the initial simplex tableau for the linear programming problem.

- 3) Maximize  $3x - y$  subject to the following constraints.

$$\begin{cases} 6x - 5y \leq 24 \\ x + 9y \geq 63 \\ x \geq 0, y \geq 0 \end{cases}$$

- 4) Maximize  $20x - 50y + 10z + 30$  subject to:

$$\begin{cases} x + y + z \leq 250 \\ x + 2z \leq 125 \\ 2y + 3z \leq 100 \\ x \geq 0, y \geq 0, z \geq 0 \end{cases}$$

Determine the particular solution corresponding to the simplex tableau.

5)  $x \ y \ u \ v \ M$

$$\left[ \begin{array}{ccccc|c} 0 & -3 & 1 & 1 & 0 & 2 \\ 1 & 2 & 0 & 0 & 0 & 6 \\ 0 & -4 & 0 & 5 & 1 & 10 \end{array} \right]$$

6)  $x \ y \ u \ v \ M$

$$\left[ \begin{array}{ccccc|c} \frac{2}{3} & 0 & 6 & 1 & 0 & 10 \\ 4 & 1 & \frac{22}{3} & 0 & 0 & \frac{5}{4} \\ -\frac{7}{2} & 0 & 1 & 0 & 1 & 121 \end{array} \right]$$

- 7) Pivot the following simplex tableau about the element 2.

$$\begin{array}{ccccc|c} x & y & u & v & M & \\ \hline 4 & 2 & 1 & 0 & 0 & 10 \\ 1 & 1 & 0 & 1 & 0 & 21 \\ \hline -5 & -6 & 0 & 0 & 1 & 17 \end{array}$$

- 8) Pivot the following simplex tableau about the element 2 (first column).

$$\begin{array}{ccccc|c} x & y & u & v & M & \\ \hline 4 & 2 & 1 & 0 & 0 & 25 \\ 0 & 5 & 0 & 1 & 0 & 7 \\ \hline 2 & -3 & 0 & 0 & 1 & 12 \end{array}$$