

## Homework #3

Please write your answers on a separate sheet of paper, and include at least some intermediate steps and English words.

This homework is intended to cover sections 2.1 through 2.3.

- 1 Solve the following linear programming problem using the simplex method.

$$\begin{aligned} &\text{Maximize } z = 2x + 5y \\ &\text{subject to} \\ &3x + 5y \leq 8, \\ &2x + 7y \leq 12, \\ &x \geq 0, y \geq 0 \end{aligned}$$

- 2 Consider the following tableau, which arose in solving a linear programming problem by the simplex method.

$x_1$	$x_2$	$x_3$	$u$	$v$	$w$	
1	5	2	0	0	3	20
0	2	4	1	0	-4	6
0	2	-1	0	1	3	12
0	-5	-3	0	0	3	12

- (a) Identify the basic feasible solution and basic variables in this tableau.  
 (b) Compute the next tableau using the simplex method.  
 (c) Identify the basic feasible solution and basic variables in the tableau in (b).

- 3 Solve the following linear programming problem using the two-phase method.

$$\begin{aligned} &\text{Maximize } z = 3x_1 - x_2 + 2x_3 + 4x_4 \\ &\text{subject to} \\ & \quad \quad \quad x_2 + 7x_3 + 2x_4 \geq 3, \\ & \quad x_1 + 2x_2 + x_3 = 9, \\ & 2x_1 + 3x_2 + x_3 - 4x_4 \leq 7, \\ & x_j \geq 0, j = 1, 2, 3, 4. \end{aligned}$$