## Lesson 26. The Simplex Method - Example

**Problem 1.** Consider the following LP:

maximize 
$$4x_1 + 3x_2 + 5x_3$$
  
subject to  $2x_1 - x_2 + 4x_3 \le 18$   
 $4x_1 + 2x_2 + 5x_3 \le 10$   
 $x_1, x_2, x_3 \ge 0$ 

- a. Construct the canonical form of this LP.
- b. Use the simplex method to solve the canonical form LP you wrote in part a. In particular:
  - Construct your initial BFS and basis by making the nonslack variables having value 0.
  - Choose your entering variable using **Dantzig's rule** that is, choose the improving simplex direction with the most positive reduced cost. (If this was a minimization LP, you would choose the improving simplex direction with the most negative reduced cost.)
- c. What is the optimal value of the canonical form LP you wrote in part a? Give an optimal solution.
- d. What is the optimal value of the original LP above? Give an optimal solution.