**EASTERN MEDITERRANEAN UNIVERSITY**



**Department of Industrial Engineering**

**IENG511 Optimization Theory**

**HOMEWORK 4 Spring 2017-18**

1. Consider the following linear programming problem



Find all BFS’s of feasible region. Find the optimal solution.

1. Consider the problem



Find a basic feasible solutions (if there exists) with the basic variables as *x1, x2,* *x4* and *x1, x3* , *x5*. Which one of these BFSs is degenerate? Why? Compute the value of objective function for the BFS(s).

1. Consider the following system



The point *(,,)* is feasible. Verify whether it is basic. If not reduce it to a basic feasible solution.

1. Solve the following problem by simplex method starting the basic solution *(x1,x2)=(4,0)*. Sketch the feasible region in non-basic variable space



1. Consider the following linear programming problem



1. Suppose that *x1* and *x2* are the basic variables, rewrite problem in the key of simplex method related to this BFS.
2. Which one of variables can introduce to the basis and improved the value of objective function.
3. Enter this variable to the basis. Find new BFS and related objective functions value.
4. Suppose that ***x=(xB, xN)*** ( ***xB=***B-1**b** and ***xN***=***0*** ) and **z=** ***cB***B-1**b** is the BFS and its associated objective value for the following linear programming problem

Min **cx**

*St.* **Axb**

**x****0**

Also suppose that . What we can say about optimal solution?

1. Solve the following problem by the simplex method.

