**EASTERN MEDITERRANEAN UNIVERSITY**



**Department of Industrial Engineering**

**IENG511 Optimization Theory**

**HOMEWORK 1 Spring 2017-18**

1. Which one of following sets can be a basis for *E3*? Why?
2. *{(-1,2,1), (1,-3,-2),(-1,1,0)}*
3. *{(1,0,3),(-1,2,1),(-1,2,2),(-3,0,0)}*
4. *{(-2,0,5),(1,0,2),(0,3,0)}*
5. Write ***b****= (3,-2,-1)* in terms of the above basis (if any).
6. Could you explain the relationship between the coordinate of the above vector in terms of the basis which mentioned in part d. and standard basis of *E3*?
7. Prof that the following definitions of basis *{****a****1,* ***a****2,…,* ***a****k}* for *En* are equivalent.
8. *{****a****1,* ***a****2,…,* ***a****k}* is independent set and it can span *En* .
9. *{****a****1,* ***a****2,…,* ***a****k}* is independent set and *k=n*.
10. *{****a****1,* ***a****2,…,* ***a****k}* is span *En* and *k=n*.
11. Show that the following linear equation system has not solution.



1. Suppose that , for which vectors like *(y1,y2,y3)* the system  *AX=Y* has a solution?
2. Which one of following matrices is nonsingular. Find the rank and determinant of them.



1. Using elementary row operations show that is invertable if and only if .
2. Show that if *AAt=I,* then *det(A)=-1* or *+1*.
3. Show in any *m* by *n* matrix say *A*, row *i* and row *j* can be intrechanged using finit number of other elementary row opreastions.
4. Solve the following linear equation system by Cramer’s Rule.



1. If it is possible write (-2,4,-1) as the linear combination of (1,01), (-2,1,1), (0,-2,3). Do the recent three vectors form a basis for R3? Which one of the following vectors can replaced by (-2,1,1) in a manner that, new set of vectors remind a basis? Why?

(2,3,1) , (-3,0,1) , (1,1,0)

1. Consider the following linear programming problem



1. Reformulate the problem so that it is standard format.
2. Reformulate the problem so that it is canonical format.
3. Convert the problem into a maximization problem.