Second Semester 1442	**First Exam**	**King Saud University**
(without calculators)	**Time: 8 - 9:30 am**	**College of Science**
Wednesday 5-7-1442	**240 Math**	**Math. Department**

Q1: If $A=\begin{bmatrix}2&4\\1&2\end{bmatrix}$, $B^T=\begin{bmatrix}1&2\\0&2\\-1&0\end{bmatrix}$, $C=\begin{bmatrix}1&1&1\\2&3&2\\1&2&2\end{bmatrix}$ and $P(x)=\frac{1}{4}x^2-x+2$, then find the following:

(a) P(A) (3 marks)

(b) adj(A) <u>in details</u> (2 marks)

(c) the inverse of C (3 marks)

(d) the solution set of Bx=0 by Gauss-Jordan Elimination. (3 marks)

(e) $T_B(1,2,3)$. (1 mark)

Q2: Find the determinant of the following matrix, then find the cofactor C_{12}:

(4 marks)

$$\begin{bmatrix}1&2&2&2\\2&5&4&4\\3&6&6&7\\4&8&10&8\end{bmatrix}$$

Q3: (a) Prove that if A is an invertible matrix, then $\det(A^{-1})=(\det(A))^{-1}$. (2 marks)

(b) Prove that if A is an invertible symmetric matrix, then A^{-1} is symmetric.

(2 marks)

(c) If $B=\begin{bmatrix}1&5\\1&2\end{bmatrix}$, then find tr(B). (1 mark)

(d) If A is a square matrix of order 2 such that det(A)= 3, then find $\det(2(A^T)^{-1})$. (2 marks)

(e) If the solution set of the system Ax=b is $\{(2r+1,s-1):r,s\in\mathbb{R}\}$, then find the solution set of the system Ax=0. (2 marks)