Name: ____

MAS 4105 Test 3 Spring 2015

1. (10 points) Let $\beta=\{(1,0),(0,1)\}$ and $\gamma=\{(0,1),(-1,3)\}$ be ordered bases for R^2. Let $T: R^2 \to R^2$ be the linear transformation $T(x,y)=(2x+y,-3x-2y)$.

(a) Find the change of coordinate matrix $Q=[I]_\gamma^\beta$.

(b) Calculate Q^{-1}.

(c) Find $[T]_\beta^\beta$.

(d) Find $[T]_\gamma^\gamma$.

(e) Calculate $T^{-1}(x,y)$.

2. (9 points) Prove Theorem 3.9: Let K be the solution set of a system of linear equations $Ax=b$, and let K_H be the solution set of the corresponding homogeneous system $Ax=0$. Let p be a particular solution to $Ax=b$. Prove that $K=\{p\}+K_H$.

3. (7 points) Let A and B be $n\times n$ matrices. Prove or disprove: If A and B are similar, then $\det(A)=\det(B)$.

4. (7 points) Let A and B be $n\times n$ matrices. Prove or disprove: If $AB=0$, and $A\neq 0$, then B is invertible.

5. (7 points) Let A and B be $n\times n$ matrices. Prove or disprove:
$\det(A+B)=\det(A)+\det(B)$