MATH 54, FALL, 2006, MIDTERM 1, GU

1. Solve linear systems of equations $Ax = b$, where $A = (0\ 1\ 1;\ 1\ 2\ 1;\ 1\ 1\ 1)$ and $b = (1;\ 0;\ 2)$.

2. Let P be the set of all 2×2 real invertible matrices. Is P a vector space under the usual matrix addition and scalar multiplication? Justify your answer.

3. Determine whether the functions $\sin(x+1)$, $\sin(x)$ and $\cos(x)$ are linearly dependent.

4. Let A = (1 -1 0; 1 1 1; 1 -1 0). Define the null space NS(A). Find the dimension and a basis of NS(A).

5. Let $a, b \in R^3$ be 3-dimensional non-zero vectors that are perpendicular to each other: $a \cdot b = 0$. Show that a and b are linearly independent.