Philadelphia University

Department of Basic Sciences

Final Exam **Linear Algebra** **02–06–2013**

1. Solve the following system of linear equations.

$$\begin{cases} x & +y & +z & = -1 \\ 2x & -y & -2z & = 6 \\ x & +3y & +2z & = -3 \end{cases}$$

2. Is the following set of vectors linearly dependent or independent?

$$\{(2,4,1,1),(2,-3,1,2),(1,0,1,-1),(-1,-2,-3,0)\}$$

3. Find the eigenvalues and eigenvectors of the matrix A.

$$A = \begin{bmatrix} 1 & 0 & 3 \\ -1 & -2 & -1 \\ 5 & 0 & 3 \end{bmatrix}$$

4. Find the new equation of the line $y = 2x - 5$ under the linear transformation given by the function $T(x, y)$.

$$T(x, y) = (x - 2y, x + y)$$

5. Find the inverse function of the linear operator $T : R^3 \to R^3$.

$$T(x, y, z) = (x - 2y, 3x + 2y + z, 3x + 3y + z)$$

–Amin Witno