Final Exam   **Linear Algebra 1**   **21–01–2020**

1. Solve the system $\left\{ \begin{array}{lll} 2x & +4y & = 7 \\ 2x & +5y & = 9 \end{array} \right\}$ in 3 ways:

   (a) (4pt) using Gauss-Jordan algorithm.

   (b) (4pt) using matrix inverse.

   (c) (4pt) using Cramer's rule.

2. (5pt) Solve the system $\left\{ \begin{array}{rrrrrl} A & +4B & -2C & +3D & -E & = 5 \\ & B & +C & -2D & -E & = 3 \\ & & & D & +E & = 1 \end{array} \right\}$ using Gauss-Jordan algorithm.

3. (5pt) Let $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 4 & 2 & 1 \end{bmatrix}$. Compute A^{-1} (any method).

4. (6pt) Let $A = \begin{bmatrix} 1 & 3 & 1 & 5 & 3 \\ -2 & -7 & 0 & -4 & 2 \\ 2 & 7 & 1 & 4 & -1 \\ 1 & 3 & 3 & 6 & 4 \\ -1 & -3 & 1 & 2 & 6 \end{bmatrix}$. Compute $\det A$ (any method).

5. (6pt) Let $u = (2, 3, -1)$ and $v = (1, 1, 2)$ and $w = (-2, 0, 1)$. Write the vector $(7, 4, -1)$ as a linear combination of u and v and w.

6. (6pt) Let $A = \begin{bmatrix} 6 & 3 & -8 \\ 0 & -2 & 0 \\ 1 & 0 & -3 \end{bmatrix}$. Find the eigenvalues and eigenvectors of A.

–Amin Witno