Due Monday, 9/24   Name: _____

Math 370 – Take Home Quiz 1

This quiz should take you approximately 25 minutes. You may use a calculator or computer, your book, and your notes, but do not work together and do not get help.

(10) 1. Give an example of three vectors $\mathbf{u}$, $\mathbf{v}$, and $\mathbf{w}$ where $\mathbf{u}$ is orthogonal to $\mathbf{v} + \mathbf{w}$ but not orthogonal to $\mathbf{v}$ or $\mathbf{w}$.

(10) 2. Let S consist of all vectors $(x, y, x + y, x - y)$ in $\mathbb{R}^4$. S is a subspace of $\mathbb{R}^4$. Find a basis for S and the dimension of S.

(10) 3. Suppose $\mathbf{A}$ and $\mathbf{B}$ are $n \times n$ symmetric matrices. Show that $\mathbf{AB} + \mathbf{BA}$ is symmetric.
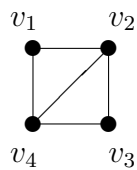
(10)   4. Let $\mathbf{A} = \begin{pmatrix} 1 & 2 & -12 \\ 0 & 2 & -10 \\ -5 & 2 & 0 \end{pmatrix}$.

   (a) Find $\mathbf{A}_R$, the row reduced echelon matrix equivalent to $\mathbf{A}$.

   (b) Give a basis for the kernel of $\mathbf{A}$.

   (c) What is rank $\mathbf{A}$?

(10)   5. (a) Write down the adjacency matrix for the graph shown below.

   (b) How many paths of length 4 are there from v_1 to v_2?