Homework #7

Math 2010
Due April 14

1. Given

$$A = \begin{bmatrix} -2 & -4 & 4 & 5 \\ 3 & 6 & -6 & -4 \\ -2 & -4 & 4 & 9 \end{bmatrix}$$

   (a) Find a basis for the row space of A.

   (b) Find a basis for the column space of A.

   (c) Find a basis for the nullspace of A.

   (d) Give the nullity of A?

   (e) Give the rank of A?

2. Find a basis for the subspace of $\Re^3$ spanned by

$$S = \{[4, 4, 8], [1, 1, 2], [1, 1, 1]\}$$

3. Find a subset of vectors from the set S that is a basis for the subspace spanned by

$$S = \{[2, 7, -2, 2], [4, 14, -4, 4], [-3, -6, 1, -2], [-6, -3, -2, -2]\}$$

4. The nonhomogeneous system $A\mathbf{x} = \mathbf{b}$ given below is consistent. Write the solution in the form $\mathbf{x} = \mathbf{x}_h + \mathbf{x}_p$ where $\mathbf{x}_h$ is the solution of $A\mathbf{x} = \mathbf{0}$ and $\mathbf{x}_p$ is the particular solution of $A\mathbf{x} = \mathbf{b}$. The system is given by

$$\begin{aligned} x + 3y + 10z &= 18 \\ -2x + 7y + 32z &= 29 \\ -x + 3y + 14z &= 12 \\ x + y + 2z &= 8 \end{aligned}$$