Homework 3

Linear Algebra, Dave Bayer, due February 18, 2014

Name: ______________________________ **Uni:** ______________

[1]	[2]	[3]	**Total**

If you need more that one page for a problem, clearly indicate on each page where to look next for your work.

[1] Find the row space and the column space of the matrix

$$\begin{bmatrix} 1 & 1 & 2 \\ 1 & 2 & 3 \\ 1 & 3 & 4 \\ 1 & 4 & 5 \end{bmatrix}$$

[2] Find a basis for the subspace V of $\mathbb{R}^4$ spanned by the vectors

$$(1, -2, 1, 0) \qquad (0, 1, -2, 1) \qquad (1, -1, -1, 1) \qquad (1, 0, -3, 2)$$

Extend this basis to a basis for $\mathbb{R}^4$.

[3] Find a 3×3 matrix A which vanishes on the plane $x + y + 2z = 0$, and is the identity on the vector $(2, 3, 4)$:

$$A \begin{bmatrix} p \\ q \\ r \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

for any vector (p, q, r) so $p + q + 2r = 0$, and

$$A \begin{bmatrix} 2 \\ 3 \\ 4 \end{bmatrix} = \begin{bmatrix} 2 \\ 3 \\ 4 \end{bmatrix}$$