HOMEWORK 5

Problem 1. Given unknons r and s, is it possible to find a and b so that

$$2\begin{bmatrix} r \\ 0 \\ -2r \\ s \end{bmatrix} - 3\begin{bmatrix} t \\ 0 \\ -2t \\ w \end{bmatrix} = \begin{bmatrix} a \\ 0 \\ -2a \\ b \end{bmatrix}?$$

If so, what are the formulas for a and b?

Problem 2. The subsetset

$$S = \left\{ \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} \middle| \, x_2 = 0, \; x_3 = -2x_1 \right\}$$

is equal to the null space of some matrix A. Find A.

Problem 3. Problem 8, section 3.2, page 132. (Notice that "a vector A in $\mathbb{R}^{2\times 2}$" means a 2-by-2 matrix A.) Model your arguments on the text on page 127 on nullspaces.

Problem 4. Problem 11, section 3.2, page 133.

Problem 5. Problem 13, section 3.2, page 133.

Problem 6. If v etc. are all vectors from the same vector space, find a solution to r, s and t (Don't worry about necesarrily finding all solutions) given that you know

$$(2\mathbf{v} - \mathbf{w}) - 2\,(2\mathbf{v} - \mathbf{q}) + 2\,(\mathbf{v} + \mathbf{w} + \mathbf{q}) = (r + s)\mathbf{v} + s\mathbf{w} + \left(s + \frac{t}{2}\right)\mathbf{q}$$