

Linear Algebra. Homework Set # 1 Due 1/23/08 Name: \_\_\_\_\_

$$x_1 - 3x_2 = 5$$

1. #14, §1.1, p.11 : Solve  $-x_1 + x_2 + 5x_3 = 2$

$$x_2 + x_3 = 0$$

2. #18, §1.1, p.11 : Do the planes  $x_1 + 2x_2 + x_3 = 4$ ,  $x_2 - x_3 = 1$ , and  $x_1 + 3x_2 = 0$  have at least one common point of intersection?: Explain.

3. #20, §1.2, p.26 : Find  $h$  and  $k$  such that  $\begin{matrix} x_1 + 3x_2 = 2 \\ 3x_1 + hx_2 = k \end{matrix}$  (a) has no solutions, (b) has a unique solution, (c) has many solutions.

4. #12, §1.3, p.38 : Given  $\mathbf{a}_1 = \begin{pmatrix} 1 \\ -2 \\ 0 \end{pmatrix}$ ,  $\mathbf{a}_2 = \begin{pmatrix} 0 \\ 5 \\ 5 \end{pmatrix}$ ,  $\mathbf{a}_3 = \begin{pmatrix} 2 \\ 0 \\ 8 \end{pmatrix}$  and  $\mathbf{b} = \begin{pmatrix} -5 \\ 1 \\ -7 \end{pmatrix}$ , determine if  $\mathbf{b}$  is a linear combination of  $\mathbf{a}_1$ ,  $\mathbf{a}_2$ , and  $\mathbf{a}_3$

5. #18, §1.3, p.38 : Let  $\mathbf{v}_1 = \begin{pmatrix} 1 \\ 0 \\ -2 \end{pmatrix}$ ,  $\mathbf{v}_2 = \begin{pmatrix} -3 \\ 1 \\ 8 \end{pmatrix}$ , and  $\mathbf{y} = \begin{pmatrix} h \\ -5 \\ -3 \end{pmatrix}$ . For what value(s) of  $h$  is  $\mathbf{y}$  in the plane spanned by  $\mathbf{v}_1$  and  $\mathbf{v}_2$ .