Tutorial 2 Solutions 1104D, Fall 2011

1. Matrices A and B are in REF, and matrix C is in RREF.

2. (a) The RREF of matrix A is

$$\begin{bmatrix} 1 & 2 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 4 \\ 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 & -2 \end{bmatrix}.$$

   (b) The variables x_1, x_3, x_4 and x_5 are basic and x_2 and x_6 are free variables.

3. The augmented matrix A associated to the system is equivalent to the following

$$A \sim \left[\begin{array}{ccc|c} 1 & 1 & 3 & 1 \\ 0 & 2 & 1 & 3 \\ 0 & 0 & 2+h & 0 \end{array}\right].$$

   So,

   (a) If $h = -2$, then there are infinitely many solutions.

   (b) There is no such h.

   (c) If $h \neq -2$, then there is exactly one solution.

4.

$$A \sim \begin{bmatrix} 1 & 5 & 0 & 8 & 1 & 0 \\ 0 & 0 & 1 & -7 & 4 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}.$$

$$\mathbf{x} = x_2 \begin{bmatrix} -5 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} + x_4 \begin{bmatrix} -8 \\ 0 \\ 7 \\ 1 \\ 0 \\ 0 \end{bmatrix} + x_5 \begin{bmatrix} -1 \\ 0 \\ -4 \\ 0 \\ 1 \\ 0 \end{bmatrix}$$