Answer key for MATH1300 midterm, October 23, 2006

1. x=t, y=t, z=1, t in $\mathbb{R}$.

2. a) $AB = \begin{bmatrix} 0 & -1 & -2 \\ 6 & 8 & 10 \end{bmatrix}$, b) A+B not defined, since A is 2X2, B is 2X3,

   c) $B + 2C^T = \begin{bmatrix} 4 & 2 & 4 \\ 0 & 1 & -2 \end{bmatrix}$,

   d) AB − BA is not defined since BA is not possible.

3. a) $A^{-1} = \begin{bmatrix} -2 & 3 & -3 \\ -1 & 1 & 0 \\ 1 & -1 & 1 \end{bmatrix}$, b) $X = \begin{bmatrix} -1 \\ -2 \\ 1 \end{bmatrix}$

4. a) $A = \begin{bmatrix} -2 & 1 \\ 1 & 0 \end{bmatrix}$, b) $E = \begin{bmatrix} 1 & -2 \\ 0 & 1 \end{bmatrix}$, $F = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$.

5. a) det(A) = 20-2a, b) $a \neq 10$.

6. det(A) = 8.

7. a) $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$, b) $X = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$, c) 2, d) 2.