Math 250   **Name (Print):** _____

Fall 2013

Quiz 4

1. (10 pts)

Find the inverse of the following elementary matrix. Show that it is indeed the inverse.

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

Answer: The inverse is

$$\begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Check:

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

2. (10 pts)

$$A^{-1} = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 0 & 1 \\ 1 & 1 & -1 \end{bmatrix} ; B^{-1} = \begin{bmatrix} 2 & -1 & 3 \\ 0 & 0 & 4 \\ 3 & -2 & 1 \end{bmatrix}$$

Find $(AB^T)^{-1}$.

Answer: $(AB^T)^{-1} = (B^T)^{-1}A^{-1} = (B^{-1})^T A^{-1}$.

So the answer is

$$\begin{bmatrix} 2 & 0 & 3 \\ -1 & 0 & -2 \\ 3 & 4 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 & 3 \\ 2 & 0 & 1 \\ 1 & 1 & -1 \end{bmatrix} = \begin{bmatrix} 5 & 7 & 3 \\ -3 & -4 & -1 \\ 12 & 7 & 12 \end{bmatrix}$$