Problem 1. In special cases, it appears Matlab violates the associative law for matrix multiplication. In Matlab, the transpose $A^T$ is entered as $A'$ while multiplication $AB$ becomes $A*B$. If you enter $A*B'*C$ that is the same as $(A*(B'))*C$. If you want to force the order of operations, you can use parentheses, as in $A*(B'*C)$.

However, here are two Matlab sessions:

**Session One:**
```
>> [1 1 1]*([7 2]*[1 -1]')
ans =
   5   5   5
>>
```

**Session Two:**
```
>> ([1 1 1]*[7 2])*[1 -1]'
??? Error using ==>
Inner matrix dimensions must agree.
>>
```

Get Matlab running and figure out what is going on. Don’t turn in any Matlab output. Answer the following, using at most a few sentences for each question.

(a) Which time is Matlab correct, Session One or Session Two, and why?
(b) What “helpful” convention or conventions is Matlab using that create this trouble?
Problem 2. Find the inverse of each of the following matrices, or explain why it is not possible to do so. Also express each of the following as a product of elementary matrices, or explain why it is not possible to do so.

(a) \[ A = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix} \]

(b) \[ B = \begin{bmatrix} 1 & 2 & 1 \\ 0 & 3 & 1 \\ 0 & 0 & 1 \end{bmatrix} \]

Problem 3. Suppose

\[ A = \begin{bmatrix} -1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \]

Express each of the following and a product of elementary matrices:

(a) \[ A^2 \]

(b) \[ A^{-1} \]

Problem 4. Section 1.4, number 12(b). (page 70) You may use Matlab for this. If you do, print the relevant output.

Problem 5. problem 15, section 1.4, page 71.

Problem 6. Section 1.6, number 15, page 81.