MATH 466, Spring 2004

Assignment 1

Due Date: Feb 9

IMPORTANT NOTE: A penalty of 30% of total points will be applied to late homework. Write your answers clearly.

1. Do the following problems:
   Sec 6.1 : 3(a), 5
   Sec 6.2 : 1-4 with 1(a) matrix.
   Sec 6.3 : 1(a), 4.
   Sec 6.4 : 6, 10.
   Sec 6.5 : 3(a), 4(a).
   Sec 6.6 : 1, 3 and 5 with 2(a) matrix, 6(c),11.

2. Show that the Gaussian Elimination with Backward Substitution requires $\frac{n^3}{3} + \frac{n^2}{3} - \frac{n}{3}$ multiplications/divisions, and $\frac{n^3}{3} + \frac{n^2}{2} - \frac{5n}{6}$ additions/subtractions.

3. Show that $\det(AB) = \det(A)\det(B)$ for $n \times n$ matrices $A$ and $B$.

4. (Programming) GEpartialpivot.m is MATLAB code for Gaussian Elimination with partial pivoting. Fill out the backward substitution in GEpartialpivot.m and test it with the following matrix:

\[
\begin{bmatrix}
6.0 \times 10^{-7} & 1 \\
1 & 1
\end{bmatrix}
\begin{bmatrix}
x_1 \\
x_2
\end{bmatrix}
= 
\begin{bmatrix}
1 \\
2
\end{bmatrix}
\]

Compare this solution with Gaussian Elimination without pivoting, which can be obtained by modifying the same MATLAB code. Which one is correct? Explain why these two solutions are different.