Name: _____

Class Time: _____

1. Compute the norms of the following error vectors:

(a)

$$\hat{\mathbf{e}}^{(0)} = \begin{bmatrix} 0.09216 \\ -0.5442 \\ 0.5239 \end{bmatrix}$$

(b)

$$\hat{\mathbf{e}}^{(1)} = \begin{bmatrix} 0.001707 \\ -0.013 \\ 0.0124 \end{bmatrix}$$

2. Again, calculate the norms of the error $\mathbf{e}^{(k)}$ where $\mathbf{e}^{(k)} := \mathbf{x} - \mathbf{x}^{(k)}$, $k = 1, \ 2$ provided the exact solution $\mathbf{x}$ is

$$x = \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}$$

and, the iterates $\mathbf{x}^{(1)}$ and $\mathbf{x}^{(2)}$ are given by:

$$\mathbf{x}^{(1)} = \begin{bmatrix} 1.1111 \\ 1.9 \\ 0 \end{bmatrix}, \quad \mathbf{x}^{(2)} = \begin{bmatrix} 0.9 \\ 1.6778 \\ -0.9936 \end{bmatrix}.$$

3. Consider the Jacobi and Gauss Seidel methods applied to solve the following system:

$$4x_1 + 3x_2 = 7$$
$$x_1 + 3x_2 = 4$$

Compute $\mathbf{x}_J^{(k)}$, $\mathbf{x}_{GS}^{(k)}$ for $k = 1, 2$ with initial guess $\mathbf{x}^{(0)} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$.

Do we have convergence ?