---NUMERICAL ANALYSIS QUESTIONS FOR STUDY---

1. \( f(x) = x \sin(x) - 1 = 0 \)
   Employ False Position to find the root, regarding \([0, 2]\).

2. \( f(x) = e^x - x \)
   Use the Fixed Position method to find the root until \(|e_o| < 0.05\).

3. Use Taylor series expansion with \(n=2\) to approximate \(f(x) = \cos x\) at \(x=0.01\), while \(x_o=0\).

4. Solve the system of equations:

\[
\begin{align*}
4x_1 + 4x_2 + x_3 + 4x_4 &= 12 \\
2x_1 + 5x_2 + 7x_3 + 4x_4 &= 1 \\
10x_1 + 5x_2 - 5x_3 &= 25 \\
-2x_1 - 2x_2 + x_3 - 3x_4 &= -10
\end{align*}
\]

by Gaussian elimination with partial pivoting.

5. Use LU decomposition to determine the matrix inverse for the following system. Do not use a pivoting strategy, and check your results by verifying that \( [A][I] = I \).

\[
\begin{align*}
10x_1 + 2x_2 - x_3 &= 27 \\
-3x_1 - 6x_2 + 2x_3 &= -61.5 \\
x_1 + x_2 + 5x_3 &= -21.5
\end{align*}
\]