Math 308 Practice Test 6A

For the first four problems, do not use MATLAB except to check your answer or perform arithmetic.

1. Find all solutions to the following system of linear equations:

\[
\begin{align*}
x - 2y + 3z &= 7 \\
-x + y - 2z &= -5 \\
2x - y - z &= 4
\end{align*}
\]

2. Compute the determinant of the following matrix:

\[
A = \begin{pmatrix}
3 & 2 & 1 \\
-1 & -5 & 2 \\
0 & 1 & -1
\end{pmatrix}
\]

3. Determine the eigenvalues and eigenvectors of the following matrix:

\[
A = \begin{pmatrix}
1 & 1 & 2 \\
0 & 2 & 2 \\
1 & 3 & 4
\end{pmatrix}
\]

4. Use eigenvalues and eigenvectors to solve the following system of differential equations:

\[
\begin{align*}
x' &= 3x - 2y \\
y' &= 4x - y
\end{align*}
\]

For the following problem, do not use the Matlab command \texttt{dsolve}. You may use any other Matlab command.

5. Use Matlab (but not \texttt{dsolve}) to solve the following system of differential equations:

\[
\begin{align*}
x'' - 2x' + 2y' - x &= 0 \\
y'' + 12y - 4y' + 4x' - 13x &= 0
\end{align*}
\]