1. Find all values of $c$ for which the following system has (i) no solution (ii) exactly one solution (iii) infinitely many solutions.

\[
\begin{align*}
    x + y + z &= 4 \\
    z &= 2 \\
    (c^2 - 4)z &= c - 2
\end{align*}
\]

2. Use Cramer’s rule to solve for $y$ the system

\[
\begin{align*}
    3x - 4y + z &= 2 \\
    -2x + y &= 2 \\
    4x - 3z &= 0
\end{align*}
\]
3. Matrix $A$ is such that $A^4 = 0$. Verify that $(I - A)^{-1} = I + A + A^2 + A^3$.

4. Use elementary row operations to find the inverse (if it exists) and the determinant of the matrix

\[
\begin{pmatrix}
1 & 2 & -3 & 1 \\
-1 & 0 & 3 & 4 \\
0 & 1 & 2 & -1 \\
4 & 6 & 0 & -6
\end{pmatrix}
\]