1. Page 94, number 2. Give reasons for your answer.

2. Use row reduction to show that
\[
\begin{vmatrix}
1 & 1 & 1 \\
a & b & c \\
a^2 & b^2 & c^2
\end{vmatrix} = (b-a)(c-a)(c-b)
\]

3. For which value(s) of \(k\) does
\[
\begin{pmatrix}
k - 3 & -2 \\
-2 & k - 2
\end{pmatrix}
\]
fail to be invertible. Calculate the determinant to get the answer.

4. Find the eigenvalues and the eigenvectors corresponding to each eigenvalue for the matrix below. Show your work.
\[
\begin{pmatrix}
2 & 3 \\
1 & 0
\end{pmatrix}
\]

5. (a) Find two vectors in \(\mathbb{R}^2\) with norm 1 that are orthogonal to \((3, -1)\)

(b) Show that there are infinitely many vectors in \(\mathbb{R}^3\) with norm 1 that are orthogonal to \((1, 1, 1)\).