

1) Find the determinant of the matrix below.

$$\begin{bmatrix} 1 & 3 & -1 \\ 0 & 2 & 2 \\ 4 & -2 & 1 \end{bmatrix}$$

2) Find the determinant of the matrix below.

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 2 & 2 & 0 & 0 & 0 \\ 5 & 5 & 5 & 5 & 5 \\ 4 & 4 & 4 & 4 & 0 \\ 3 & 3 & 3 & 0 & 0 \end{bmatrix}$$

3) Suppose the matrix A has size 6×6 . That is, 6 rows and 6 columns. It is known that the equation $A\vec{x} = \vec{b}$ has a solution when $b = [1 \ 2 \ 5 \ 4 \ 5 \ 1]^T$. It is also known that $|A| = 3$. How many solutions are there to $A\vec{x} = \vec{b}$?