

1. Find the values of a and b for which the following hold: $\begin{bmatrix} a & b \\ -a & 2b \end{bmatrix} \begin{bmatrix} 2 \\ -1 \end{bmatrix} = \begin{bmatrix} 5 \\ 4 \end{bmatrix}$
2. If matrix $A = \begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$ and $A^2 = pA$, then write the value of p.
3. If $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$, verify that $A^2 - 7A - 2I = 0$
4. Find the value of x for which $\begin{bmatrix} x & -5 & -1 \end{bmatrix} \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix} \begin{bmatrix} x \\ 4 \\ 1 \end{bmatrix} = 0$
5. If $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$, show that $A^3 = 4A$
6. Find the matrix X such that $\begin{pmatrix} 2 & -1 \\ 0 & 1 \\ -2 & 4 \end{pmatrix} X = \begin{pmatrix} -1 & -8 & -10 \\ 3 & 4 & 0 \\ 10 & 20 & 10 \end{pmatrix}$
7. If $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$, prove that: $A^3 - 6A^2 + 7A + 2I = 0$