Practice Problems

1. Compute the determinant of:

a) $\begin{bmatrix} 6 & -3 & 2 \\ 0 & 5 & -5 \\ 3 & -7 & 8 \end{bmatrix}$

b) $\begin{bmatrix} 4 & 5 & -8 \\ 1 & 0 & 2 \\ 7 & 3 & 6 \end{bmatrix}$

c) $\begin{bmatrix} 1 & 5 & 7 \\ 2 & 1 & -2 \\ 3 & 6 & 5 \end{bmatrix}$

2. A 4×4 matrix B has determinant $= 5$, and another 4×4 matrix A has determinant $= 6$.

What is the determinant of:

(a) B^2

(b) BA^T → transpose of A

3. Is 5 an eigenvalue of $A = \begin{bmatrix} 6 & -3 & 1 \\ 3 & 0 & 5 \\ 2 & 2 & 6 \end{bmatrix}$?

4. The characteristic polynomial of a 6×6 matrix P is $x^6 - 4x^5 - 12x^4$. Write down the eigenvalues of P.

5. Let $A = \begin{bmatrix} 4 & -1 & 6 \\ 2 & 1 & 6 \\ 2 & -1 & 8 \end{bmatrix}$.

One eigenvalue is 2. Find the remaining eigenvalues.
How many linearly independent eigenvectors can you find?

6. Find the eigenvalues and eigenvectors of $A = \begin{bmatrix} 2 & 3 \\ 3 & -6 \end{bmatrix}$.