# Matrix Diagonalization

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Diagonalization means taking a matrix and writing it as a product of matrices, and one of the matrix will have values along the diagonal. The general format can be written as:

$$A = XDX^{-1}$$

Taking $X^{-1}$ in both sides:

$$X^{-1}AX = D$$

From the equation, X diagonalizes A. This transformation only works if A has unique eigenvalues or with duplicate eigenvalues, it should have linearly independent eigenvectors, since D contains the eigenvalues of A, and X is made up of the eigenvectors.