

All of this work is garbage

$$\frac{24}{-15}$$

Invertibility

$$A = \begin{bmatrix} -4 & 3 & 2 \\ -3 & 2 & 2 \\ -4 & 4 & 1 \end{bmatrix} \rightarrow \det A = -4 \det \begin{bmatrix} 2 & 2 \\ 4 & 1 \end{bmatrix} - (3) \det \begin{bmatrix} -3 & 2 \\ -4 & 1 \end{bmatrix} + (2) \det \begin{bmatrix} -3 & 2 \\ -4 & 4 \end{bmatrix}$$

$$\det A = 1 \therefore \text{matrix } A \text{ is invertible}$$

Diagonalization

$$A = \begin{bmatrix} -4 & 3 & 2 \\ -3 & 2 & 2 \\ -4 & 4 & 1 \end{bmatrix} \rightarrow A - \lambda I = \begin{bmatrix} -4-\lambda & 3 & 2 \\ -3 & 2-\lambda & 2 \\ -4 & 4 & 1-\lambda \end{bmatrix} \rightarrow \det(A - \lambda I)$$

$$\det[A - \lambda I] = (-4-\lambda) \det \begin{bmatrix} 2-\lambda & 2 \\ 4 & 1-\lambda \end{bmatrix} - (3) \det \begin{bmatrix} -3 & 2 \\ -4 & 1-\lambda \end{bmatrix} - (2) \det \begin{bmatrix} -3 & 2-\lambda \\ -4 & 4 \end{bmatrix}$$

$$1 \begin{vmatrix} 2-\lambda & 2 \\ 4 & 1-\lambda \end{vmatrix} - 3 \begin{vmatrix} -3 & 2 \\ -4 & 1-\lambda \end{vmatrix} - 2 \begin{vmatrix} -3 & 2-\lambda \\ -4 & 4 \end{vmatrix}$$

$$\lambda^2 - 3\lambda - 6 = -\lambda^3 + 7\lambda^2 - 11\lambda - 47 = 0$$

$$\lambda^2 - 3\lambda - 6$$

$$\lambda_s \{7, 1, -1\}$$

$$\text{Eigenvector for } \lambda_1 = 7: A - 7I = \begin{bmatrix} -4 & 3 & 2 \\ -3 & 2 & 2 \\ -4 & 4 & 1 \end{bmatrix} - \begin{bmatrix} 7 & 0 & 0 \\ 0 & 7 & 0 \\ 0 & 0 & 7 \end{bmatrix} = \begin{bmatrix} -11 & 3 & 2 \\ -3 & -5 & 2 \\ -4 & 4 & -6 \end{bmatrix}$$

$$\begin{bmatrix} -11 & 3 & 2 \\ -3 & -5 & 2 \\ -4 & 4 & -6 \end{bmatrix} \vec{v} = \vec{0}$$

↓ RREF

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \quad \begin{matrix} \vec{v}_1 = 0 \\ \vec{v}_2 = 0 \\ \vec{v}_3 = 0 \end{matrix}$$

According to chat GPT, the matrix is not diagonalizable!

Reference chat output and ask Bore.