

$$\begin{array}{r} 14 \\ x-3 \end{array}$$

$$\begin{array}{r} 14 - \lambda \\ -3 \overline{) -42 \ 3\lambda} \\ -\lambda \overline{) -14\lambda \ \lambda^2} \end{array}$$

$$\begin{array}{r} 15 \\ x \ 30 \end{array}$$

$$\begin{array}{r} -42 \\ x \ 11 \end{array}$$

$$\begin{array}{r} 11 \\ x \ 11 \end{array}$$

$$\begin{array}{r} \lambda^2 - 11\lambda - 42 \\ -\lambda \overline{) -\lambda^3 \ 11\lambda^2 - 42\lambda} \\ -11 \overline{) -11\lambda^2 \ 121\lambda \ 462} \end{array}$$

$$\begin{array}{r} 462 \\ -450 \end{array}$$

$$-\lambda^3 + 121\lambda + 42\lambda + 462 - (450 + 150\lambda)$$

$$-\lambda^3 + 163\lambda + 12 + 150\lambda \xrightarrow{(-)} -\lambda^3 + 13\lambda + 12 = 0$$

$$-\lambda^3 + 13\lambda + 12$$

$$-(\lambda + 1)(\lambda + 4)(\lambda - 3) = 0$$

Our eigenvalues are $\lambda \in \{-1, -4, 3\}$

$$\lambda = -1 : A + 1I = \begin{bmatrix} -10 & -15 & 0 \\ 10 & 15 & 0 \\ -6 & -6 & -2 \end{bmatrix} \rightarrow \text{RREF} \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & -2/3 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\vec{v}_1 + \vec{v}_3 = 0 \\ \vec{v}_2 + \frac{2}{3}\vec{v}_1 = 0$$