

Math Camp
Homework 10

(1) For what value of a are the vectors $\begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$, $\begin{pmatrix} -1 \\ 2 \\ 0 \end{pmatrix}$, and $\begin{pmatrix} 0 \\ 1 \\ a \end{pmatrix}$ linearly dependent?

(2) Find the rank of the matrix $\begin{pmatrix} 1 & 2 & 1 & 2 \\ -1 & 3 & 0 & -1 \\ 2 & -1 & 1 & 3 \\ 1 & 7 & 2 & 3 \end{pmatrix}$.

(3) For the following matrices, compute the eigenvalues, and then find an eigenvector that corresponds to each eigenvalue.

(a) $\begin{pmatrix} 1 & -2 \\ 1 & 4 \end{pmatrix}$

(b) $\begin{pmatrix} 1 & 3 \\ 3 & 9 \end{pmatrix}$

(c) $\begin{pmatrix} 1 & 2 & 0 \\ 0 & 4 & -1 \\ 0 & 0 & 3 \end{pmatrix}$