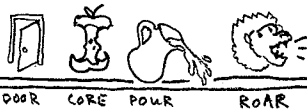
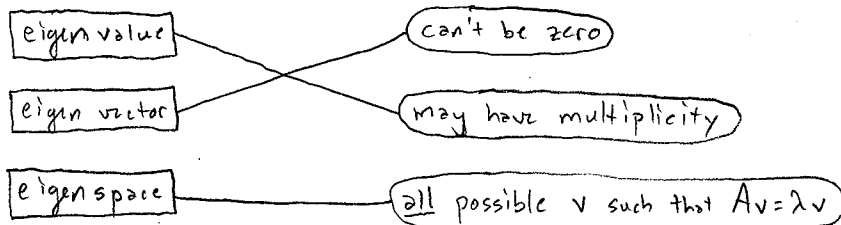


Math 54 Quiz 4



Solutions!

① Match the words with the clues:



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

$$A - 5I = \begin{bmatrix} 1 & -3 & 1 \\ 3 & -5 & 5 \\ 2 & 2 & 1 \end{bmatrix} \xrightarrow[\text{R3-2R1}]{\text{R2-3R1}} \begin{bmatrix} 1 & -3 & 1 \\ 0 & 4 & 2 \\ 0 & 8 & -1 \end{bmatrix} \xrightarrow{\text{R3-2R2}}$$

$$\begin{bmatrix} 1 & -3 & 1 \\ 0 & 4 & 2 \\ 0 & 0 & -5 \end{bmatrix}$$

Pivot in every row means
this matrix has trivial nullspace!
5 is not an e-value.

③ If x is an eigenvector for A corresponding to λ , what is $A^3 x$?

$$\begin{aligned} A^3 x &= A^2(Ax) = A^2 \lambda x = \lambda A^2 x = \lambda A(Ax) \\ &= \lambda A \lambda x = \lambda^2 Ax = \boxed{\lambda^3 x}. \end{aligned}$$