

49.) $A = \alpha \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \end{bmatrix}$

$Ax = \lambda x$, so λ is an eigen value of A

$A = \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$ $a + b + c = \lambda$
 $d + e + f = \lambda$
 $g + h + i = \lambda$
 if $x = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$

then $\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} = \begin{bmatrix} a + b + c \\ d + e + f \\ g + h + i \end{bmatrix} = \begin{bmatrix} \lambda \\ \lambda \\ \lambda \end{bmatrix}$
 $A \quad x$ factor out λ

$\lambda \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$

So

$Ax = \lambda x$

b) any nonzero multiple of x is a corresponding eigen vector