3. Consider the following matrix A:

$$A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 1 & 0 \\ 4 & 2 & 2 \end{bmatrix}$$

For each value of λ given below determine if it is an eigenvalue of A.

a) $\lambda = 0$

$0+0+0-6 \neq 0$

$0+0+0-6=0$

X

b) $\lambda = -1$

$1+3-7-6=0$

$-9=0$

X

c) $\lambda = -2$

$8+12-14-6=0$

$20-20=0$

$0=0$ ✓

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

$8+12$ 20

$\lambda = -2$ is the only eigenvalue of A

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

20/20

$(-\lambda)((1-\lambda)(2-\lambda)-0)-1(1(2-\lambda)-0)+2(2-4(1-\lambda))$

$(-\lambda)(2-3\lambda+\lambda^2)-(2-\lambda)+2(2-4+4\lambda)$

$-2\lambda+3\lambda^2-\lambda^3-2+\lambda+4-8+8\lambda$

$-\lambda^3+3\lambda^2+7\lambda-6$