Quiz 5

Name: HAEJIN JO

Section: 3D

2/2

Use the determinant to find out for which values of k the following matrix is invertible.

$$A = \begin{bmatrix} 1 & 1 & k \\ 1 & k & k \\ k & k & k \end{bmatrix}$$

$\det A = \det\left(\begin{bmatrix} k & k \\ k & k \end{bmatrix}\right) - \det\left(\begin{bmatrix} 1 & k \\ k & k \end{bmatrix}\right) + k\det\left(\begin{bmatrix} 1 & k \\ k & k \end{bmatrix}\right)$

$= (k^2 - k^2) - (k - k^2) + k(k - k^2)$

$= 0 - k + k^2 + k^2 - k^3$

$= -k^3 + 2k^2 - k$

$= -k(k^2 - 2k + 1)$

$= -k(k-1)(k-1) = 0$ when $k = 1$ or 0

so A is invertible when $k \neq 0$ or 1