

Math 205

Quiz #3

1. For what values of k is the following matrix not invertible:

$$A = \begin{bmatrix} 1 & 0 & 1 & 6 \\ k & 0 & 3 & 2 \\ 1 & k & 0 & 0 \\ 0 & 0 & 4 & 2 \end{bmatrix}$$

$$\det(A) = -k \det \left(\begin{bmatrix} 1 & 1 & 6 \\ k & 3 & 2 \\ 0 & 4 & 2 \end{bmatrix} \right)$$

$$= -k \left(\det \left(\begin{bmatrix} 3 & 2 \\ 4 & 2 \end{bmatrix} \right) - k \det \left(\begin{bmatrix} 1 & 6 \\ 4 & 2 \end{bmatrix} \right) \right)$$

$$= -k (-2 + 22k)$$

$$\Rightarrow k = 0, k = \frac{1}{11}$$