

Quiz 4, Linear Algebra

Dr. Adam Graham-Squire

Name: _____

1. (3 points) Let $A = \begin{bmatrix} 2 & 5 \\ -3 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & -5 \\ 3 & k \end{bmatrix}$. What value(s) of k , if any, will make $AB = BA$?

2. (2 points) Set up and explain how to find the inverse of $\begin{bmatrix} 1 & 0 & -2 \\ -3 & 1 & 4 \\ 2 & -3 & 4 \end{bmatrix}$. You do not have to actually find the inverse (if it exists), just set up the calculation and explain what you would do to find the inverse (and what you would get if it was not invertible).

3. (2 points) Let $\mathbf{u} = \begin{bmatrix} -3 \\ 2 \\ -5 \end{bmatrix}$ and $\mathbf{v} = \begin{bmatrix} a \\ b \\ c \end{bmatrix}$. Compute (a) $\mathbf{v}^T \mathbf{u}$ and (b) $\mathbf{v} \mathbf{u}^T$.

4. (3 points) Explain why the columns of an $n \times n$ matrix A are linearly independent when A is invertible. (Note: you cannot just say “because of the Invertible Matrix Theorem”, you must give an explanation).