

Quiz 3

September 13, 2018

Student ID

Name (Last, First)

1. Determine whether or not T is a linear transformation. If it is a linear transformation, explain why. If it is not, then give a specific example why.

$$T\left(\begin{bmatrix} x \\ y \end{bmatrix}\right) = \begin{bmatrix} x^2 + 3y \\ 2x \end{bmatrix}.$$

2. Find the standard matrix A for the linear transformation T satisfying

$$T \left(\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} \right) = \begin{bmatrix} 4 \\ 2 \\ 11 \end{bmatrix}, \quad T \left(\begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix} \right) = \begin{bmatrix} 4 \\ 2 \\ 9 \end{bmatrix}, \quad T \left(\begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix} \right) = \begin{bmatrix} 2 \\ 0 \\ 5 \end{bmatrix}.$$

What is the rank¹ of A ?

¹Definition. The rank of A is the dimension of the column space of A .