

Name: _____

MASTERY QUIZ DAY 25

Math 237 – Linear Algebra

Version 6

Fall 2017

Show all work and justify all of your answers. Answers without work or sufficient reasoning will not receive credit. You may use a calculator, but you must show all relevant work to receive credit for a standard.

A3. Determine if each of the following linear transformations is injective (one-to-one) and/or surjective (onto).

(a) $S : \mathbb{R}^2 \rightarrow \mathbb{R}^4$ given by the standard matrix $\begin{bmatrix} 2 & 1 \\ 1 & 2 \\ 0 & 1 \\ 3 & -3 \end{bmatrix}$.

(b) $T : \mathbb{R}^4 \rightarrow \mathbb{R}^3$ given by the standard matrix $\begin{bmatrix} 2 & 3 & -1 & 1 \\ -1 & 1 & 1 & 1 \\ 4 & 11 & -1 & 5 \end{bmatrix}$

A4. Let $T : \mathbb{R}^{2 \times 3} \rightarrow \mathbb{R}^3$ be the linear map given by $T\left(\begin{bmatrix} a & b & c \\ x & y & z \end{bmatrix}\right) = \begin{bmatrix} a+x \\ b+y \\ c+z \end{bmatrix}$. Compute a basis for the kernel and a basis for the image of T .

A3:

A4: