

Name: \_\_\_\_\_

**MASTERY QUIZ DAY 23**

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

(b)  $T : \mathbb{R}^4 \rightarrow \mathbb{R}^3$  given by the standard matrix  $\begin{bmatrix} 2 & 3 & -1 & -2 \\ 0 & 1 & 3 & 1 \\ 2 & 1 & -7 & -4 \end{bmatrix}$

**A4.** Let  $T : \mathbb{R}^{2 \times 2} \rightarrow \mathbb{R}^3$  be the linear map given by  $T\left(\begin{bmatrix} a & b \\ x & y \end{bmatrix}\right) = \begin{bmatrix} a+x \\ 0 \\ b+y \end{bmatrix}$ . Compute a basis for the kernel and a basis for the image of  $T$ .

**A3:**

**A4:**