NAME: _____

Math 309 **PRACTICE** Final Exam

December 2016

You may use a scientific calculator, but no graphing calculators or other electronic devices allowed. You may use one hand-written (by you) 4×6 index card of notes. Fill out your scantron cards with your name (including your official "preferred" name) and your ID number. Note that each question, whether true/false or multiple choice, is worth 4 points.

Part I: True or False Determine if each of the following statements is true or false.

1. Every matrix is row equivalent to one and only one echelon matrix.

   A) True B) False

   Since the leading entries need not be 1, echelon form is not unique. (However, reduced echelon form is unique.)

2. The homogeneous equation $A\mathbf{x} = \mathbf{0}$ has the trivial solution if and only if the equation has at least one free variable.

   A) True B) False

   $A\vec{x} = \vec{0}$ always has the trivial solution.

3. A set of two vectors is linearly dependent if and only if one vector is a multiple of another.

   A) True B) False

   (However, note the warning on page 59.)

4. If A is a 3×5 matrix and T is a transformation defined by $T(\mathbf{x}) = A\mathbf{x}$, then the domain of T is $\mathbb{R}^3$.

   A) True B) False

   $T : \mathbb{R}^5 \to \mathbb{R}^3$ (domain) $\qquad \begin{bmatrix} \vdots & \vdots & \vdots & \vdots & \vdots \end{bmatrix} \begin{bmatrix} \vdots \\ \vdots \\ \vdots \\ \vdots \\ \vdots \end{bmatrix} = \begin{bmatrix} \vdots \\ \vdots \\ \vdots \end{bmatrix}$