Sample Quiz 1, Math 1554

PLEASE PRINT YOUR NAME CLEARLY IN ALL CAPITAL LETTERS

First Name _____ Last Name _____

GTID Number: _____

Student GT Email Address: _____@gatech.edu

Section Number (e.g. A4, QH3, etc.) _____ TA Name _____

Student Instructions

- **Show your work** and justify your answers for all questions unless stated otherwise.
- **Organize your work** in a reasonably neat and coherent way.
- Calculators, notes, cell phones, books are not allowed.
- Use dark and clear writing: your exam will be scanned into a digital system.
- Exam pages are double sided. Be sure to complete both sides.
- Leave a 1 inch border around the edges of exams.
- Any work done on scratch paper will not be collected and will not be graded.

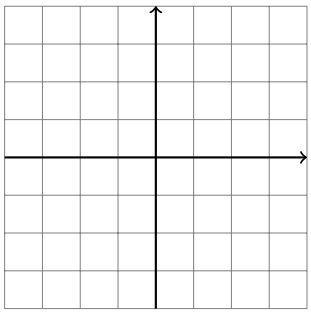
You do not need to justify your reasoning for questions in this quiz.

1. (4 points) Suppose A is an $m \times n$ matrix, $\vec{b} \in \mathbb{R}^m$. Indicate **true** if the statement is true, otherwise, indicate **false**.

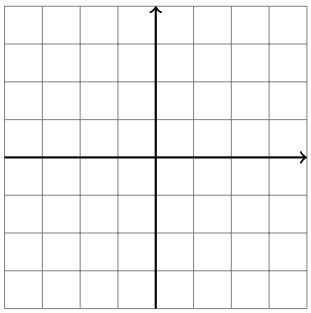
	true	false
a) If A is a 3×2 matrix with 2 pivot columns, $A\vec{x} = \vec{0}$ has a unique solution.	◯	◯
b) If a linear system has more unknowns than equations, then the system always has at least one solution.	◯	◯
c) If the columns of A span $\mathbb{R}^m$, then there must be a pivot in every column of A.	◯	◯
d) If A is a 6×7 matrix and has two pivot columns, $A\vec{x} = \vec{b}$ has 4 free variables.	◯	◯

2. (3 points) Consider the matrix $A = \begin{pmatrix} 1 & 2 \\ -2 & -4 \end{pmatrix}$. In the grids below, draw (a) the solution set of $A\vec{x} = \binom{1}{-2}$, (b) the solution set of $A\vec{x} = \vec{0}$, and (c) the span of the columns of A.

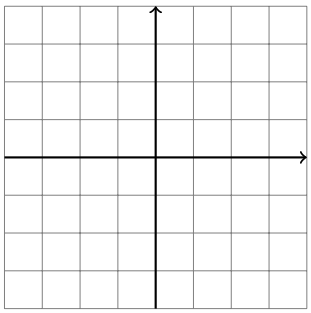
(a) $A\vec{x} = \binom{1}{-2}$



(b) $A\vec{x} = \vec{0}$



(c) span of cols of A



3. (3 points) If possible, write down an example of a matrix with the following properties. If it is not possible to do so, write *not possible*.

   (a) A 3×4 matrix A, in RREF, with just the second and third columns pivotal.

   (b) An augmented matrix that can be used to compute the coefficients a_0, a_1, a_2 of the polynomial $y(x) = a_0x + a_1x^2 + a_2x^3$ that takes the values $y(-1) = 4,\ y(0) = 1,\ y(2) = -1$.