Vocabulary Review

Short-answer, multiple-choice, and select-all questions about key vocabulary.

Question 1 *A linear system of equations that has no solutions is said to be* $\boxed{inconsistent}$*. With one or more solutions, the system is* $\boxed{consistent}$*.*

Question 2 *Suppose that for matrix E, two conditions hold:*

(a) *The first nonzero entry in each row of E is equal to 1. This leading entry 1 is called a* $\boxed{pivot}$*.*

(b) *The leading entry in the $(i+1)^{st}$ row of E occurs in a column to the right of the column where the leading entry in the i^{th} row occurs.*

Then the matrix E is (row) $\boxed{echelon form}$*. (Hint: two words.)*

Note: A consequence of this definition is that all rows that are identically zero occur at the (top/ bottom ✓) of the matrix.

Question 3 *If an $m \times n$ matrix can be transformed into another by a sequence of elementary row operations, the two matrices are said to be* $\boxed{row equivalent}$*. (Hint: two words.)*

Question 4 *Suppose that for matrix E, two conditions hold:*

(a) *E is in echelon form, and*

(b) *in every column of E having a pivot, every entry in that column other than the pivot is 0.*

Then E is said to be in $\boxed{reduced echelon form}$*. (Hint: three words.)*

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Question 5 *Let A be an $m \times n$ matrix that is row equivalent to a reduced echelon form matrix E. The number of nonzero rows in E is called the* $\boxed{\textit{rank}}$ *of A.*

Question 6 *A mapping $L : \mathbb{R}^n \to \mathbb{R}^m$ is* $\boxed{\textit{linear}}$ *if*

(a) $L(x + y) = \boxed{L(x) + L(y)}$ *for all $x, y \in \mathbb{R}^n$.*

(b) $L(cx) = \boxed{cL(x)}$ *for all $x \in \mathbb{R}^n$ and all scalars $c \in \mathbb{R}$.*

Question 7 *Let j be an integer between 1 and n. The n-vector e_j is the vector that has a* $\boxed{1}$ *in the j^{th} entry and a* $\boxed{0}$ *in every other entry.*

Question 8 *Given an $n \times n$ matrix A, if there is an $n \times n$ matrix B such that $AB = I_n$ and $BA = I_n$, then A is said to be* $\boxed{\textit{invertible}}$*, and the matrix B is called the* $\boxed{\textit{inverse}}$ *of A. If there is no such matrix B, the A is said to be noninvertible, or* $\boxed{\textit{singular}}$*.*

Question 9 *If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, then the determinant of A, $det(A) = \boxed{ad - bc}$.*
