姓名: SOLUTION　　葉均承　　應數一線性代數

學號: _____　　**Quiz 5**　　考試日期: 2024/10/16

不可使用手機、計算器，禁止作弊!

1. Discribe all solutions of a linear system whose corrponding augmented martix can be row-rreduced to the given matrix.

$$\left[\begin{array}{ccccc|c} 1 & -2 & 0 & 0 & 2 & 3 \\ 0 & 0 & 1 & 0 & 0 & 8 \\ 0 & 0 & 0 & 1 & -3 & 9 \end{array}\right]$$

Answer: ☒ the linear system is inconsistent.

☒ the linear system is consistent and the only solution is _____ .

☑ the linear system is consistent and the solution sets are _____ .

Solution：

見 quiz 4 problem 1，算法一樣。

2. Given A is a $m \times n$ matrix and B is a $n \times r$ matrix. Prove that

$$(AB)^T = B^T A^T$$

Solution：

1-3, problem 32.

3. Circle each of the following True or False and then prove or disprove (證明或反證) the following statements.

(a) True **False** If a linear system $A\vec{x} = \vec{0}$ has only the trivial solution, then $A\vec{x} = \vec{b}$ has a unique solution for every column vector $\vec{b}$ with the appropriate number of components.

Solution：

1-6, problem 38e.

(b) **True** False If A^3 is invertible, then A^2 is invertible.

Solution：

1-5, problem 23f.

(c) True **False** Every linear system with the same number of equations as unknowns has at least one solution.

Solution：

1-4, problem 29b.