姓名: SOLUTION　　葉均承　　應數一線性代數

學號: _____　　**Quiz 3**　　考試日期: 2025/10/01

1. 請框出答案. 2. 不可使用手機、計算器，禁止作弊!

1. Prove that the given relation holds for all real matrices A and B if the expression is defined.

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

Solution：

1-3 #32 。

2. Find all solution of the given linear system, using the augmented matrix and row operators.

$$\begin{cases} x_1 + 4x_2 - 2x_3 = 4 \\ 2x_1 + 7x_2 - x_3 = -2 \\ 2x_1 + 9x_2 - 7x_3 = 1 \end{cases}$$

Answer: $\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} =$ **No solution!**

Solution：

You may use the method from Example 6 in Section 1.4 of the textbook.

augmented matrix: $\begin{bmatrix} 1 & 4 & -2 & 4 \\ 2 & 7 & -1 & -2 \\ 2 & 9 & -7 & 1 \end{bmatrix}$, reduced row-echlon form: $\begin{bmatrix} 1 & 0 & 10 & 0 \\ 0 & 1 & -3 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

It is easy to see that the linear system has no solution!

```
octave:1> A=[1 4 -2 4;2 7 -1 -2;2 9 -7 1]

A =

   1   4  -2   4
   2   7  -1  -2
   2   9  -7   1

octave:2> rref(A)
ans =

    1    0   10    0
    0    1   -3    0
    0    0    0    1
```