姓名: SOLUTION 葉均承 應數一線性代數

學號: _____ **Quiz 6** 考試日期: 2021/10/28

1. 請框出答案. 2. 不可使用手機、計算器，禁止作弊!
3. 請自備白紙書寫，作答完畢請拍照上傳 Googld Classroom
4. 照片請清晰並轉正

1. Let the subspace $W = sp([1,-3,2],[2,-5,3],[-2,3,-1])$ in $\mathbb{R}^3$.
   (a) Find $dim(W)$.
   (b) Find a basis for W.
   (c) Is $dim(W) = 3$? If not, enlarge the basis you get in (b) to be a basis for $\mathbb{R}^3$.

Answer:

Let $A = \begin{bmatrix} 1 & 2 & -2 & 1 & 0 & 0 \\ -3 & -5 & 3 & 0 & 1 & 0 \\ 2 & 3 & -1 & 0 & 0 & 1 \end{bmatrix}$, and $H = rref(A) = \begin{bmatrix} 1 & 0 & 4 & 0 & 3 & 5 \\ 0 & 1 & -3 & 0 & -2 & -3 \\ 0 & 0 & 0 & 1 & 1 & 1 \end{bmatrix}$

Since the pivots are in the 1^{st}, 2^{nd} and 4^{th} column of H, we have:

1. The $dim(W) = 2$.
2. A basis for W is $\{[1,-3,2],[2,-5,3]\}$.
3. A requested basis for $\mathbb{R}^3$ is $\{[1,-3,2],[2,-5,3],[1,0,0]\}$.