姓名: SOLUTION 葉均承 應數一線性代數

學號: _____ **Quiz 4** 考試日期: 2022/03/24

1. 請框出答案. 2. 不可使用手機、計算器，禁止作弊!

1. Find the projection of [7, -3, 2] on the subspace $W = sp([2,1,2],[1,1,2])$ in $\mathbb{R}^3$

Answer:

1. the projection = $[7, \frac{1}{5}, \frac{2}{5}]$ 2. $W^{\perp}$ = $sp([0,-2,1])$

$$\vec{b} = [7,-3,2], \vec{v}_1 = [2,1,1], \vec{v}_2 = [1,0,2],$$

$$\vec{v}_3 = \vec{v}_1 \times \vec{v}_2 = [0,-2,1]$$

$$\overrightarrow{b_{W^{\perp}}} = \frac{\vec{b}\cdot\vec{v}_3}{\vec{v}_3\cdot\vec{v}_3}\vec{v}_3 = \frac{8}{5}[0,-2,1]$$

$$\vec{b}_W = b - \overrightarrow{b_{W^{\perp}}} = [7, \frac{1}{5}, \frac{2}{5}]$$