姓名: SOLUTION 葉均承 應數一線性代數

學號: _____ **Quiz 1** 考試日期: 2022/09/12

1. 請框出答案. 2. 不可使用手機、計算器，禁止作弊!

1. Find all possible scalar c such that the vector $-3\vec{i}+2\vec{j}+c\vec{k}$ is in the span of $2\vec{i}-\vec{j}-\vec{k}$ and $\vec{i}+3\vec{k}$.

   Answer: $c=5$.

   We can rewrite the question as the following:

   Find all possible scalar c such that the vector $\vec{v}=[-3,2,c]$ is in the span of $\vec{a}=[2,-1,-1]$ and $\vec{b}=[1,0,3]$.

   Since $\vec{b}=[1,0,3]$ does not included $\vec{j}(=[0,1,0])$, the $\vec{a}=[2,-1,-1]$ has to respond for the $[0,1,0]$ part of $\vec{v}=[-3,2,c]$. Therefore, the scalar coefficient of $\vec{a}=[2,-1,-1]$ is -2. The vector $\vec{b}=[1,0,3]$ is parallel to $\vec{v}-(-2)\vec{a}=[-3,2,c]-(-2)[2,-1,-1]=[1,0,c-2]$. Hence, we have $3\times 1=c-2.$, and then $c=5$.

2. Let $\vec{u}$ be any vector in $\mathbb{R}^n$, and let r and s be any scalars in $\mathbb{R}$. Please prove the following property.

$$(r+s)\vec{v}=r\vec{v}+s\vec{v}.$$

   Check example 4 from 1-1.