姓名: SOLUTION　　葉均承　　應數一線性代數

學號: _____　　**Quiz 11**　　考試日期: 2024/12/04

不可使用手機、計算器，禁止作弊!

1. Let $T : P_2 \to P_3$ be defined by $T(p(x)) = (x+2)p(x-1)$, the ordered basis for P_2 is $B = (x^2 - x, x^2 + x, 1)$ and the ordered basis for P_3 is $B' = (x^3, x^2, x, 1)$. Determine whether T is a linear transformation. If so, find the standard matrix representation A of T relative to the ordered bases B and B'.

Answer: (a) Is T a linear transformation? ($\boxed{Yes}$ / No) , if so, $A = \begin{bmatrix} 1 & 1 & 0 \\ -1 & 1 & 0 \\ -4 & -2 & 1 \\ 4 & 0 & 2 \end{bmatrix}$

(b) Given $p(x)$ so that $p(x)_B = [1, 2, 5]$, find $T(p(x)) =$ $3x^3 + x^2 - 3x + 14$

Solution：

Similar to 3-4 example 9.

2. Let T_1, T_2 be linear transformations from V to V' and let $(T_1 + T_2) : V \to V'$ be defined by

$$(T_1 + T_2)(\vec{v}) = T_1(\vec{v}) + T_2(\vec{v})$$

for each $\vec{v}$ in V. Prove that $T_1 + T_2$ is also a linear transformation.

Solution：

3-2 problem 43.