- **Problem 3** Prove there is a unique linear transformation $T : P_2(R) \to P_2(R)$ with the property that $T(1) = 2$, $T(1+x) = 1+x+x^2$, $T(1 + x^2) = 1 + x + x^2$.

Is T an isomorphism ? Justify your answer.

Let $B = 1, x, x^2$, the standard ordered basis for $P_2(R)$. Find T_B^B

- **Problem 4** Find a basis B for $L(R^2, R^2)$, the space of all linear transformations from R^2 to R^2. List explicitly all the transformations that are in this basis.

Let $T : R^2 \to R^2$ be the linear transformation defined by
$T((x, y)) = (x + y, 2x)$ Write T as a linear combination of vectors of B.