## Algebra2 Test $N^{\circ}01$

## Exercise 01:

Let F = span((1, -1, 0)) and  $G = \{(x, y, z) \in \mathbb{R}^3 | x - y + z = 0\}$ . Prove that G is a vector subspace, then precise its dimension. Does  $\mathbb{R}^3 = F \oplus G$ ? Justify.

## Exercise 02:

Do the vectors  $u_1 = (1, 0, 0)$ ,  $v_1 = (0, 1, 0)$ , and  $w_1 = (2, 5, 0)$  form a generating family for the space  $\mathbb{R}^3$ ? Consider the vectors

 $u_2 = (1, 4, -3), \quad v_2 = (-4, -4, 8) \text{ and } w_2 = (-3, 0, 5).$ 

Is the family  $\{u_2, v_2, w_2\}$  a basis for  $\mathbb{R}^3$ ?