

# Class Test n°4

Name :

First Name :

Class :

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## Question from the lesson (2 points)

Let  $E$  be a vector space over  $\mathbb{R}$  and  $S = (e_1, \dots, e_n)$  be a family of vectors of  $E$ . Give the precise mathematical definition of « $S$  is a spanning family of  $E$ ».

## Exercise 1 (2 points)

Let  $E = \{(u_n) \in \mathbb{R}^{\mathbb{N}} \text{ such that } (u_n) \text{ is bounded}\}$  and  $F = \{(u_n) \in \mathbb{R}^{\mathbb{N}} \text{ such that } (u_n) \text{ is divergent}\}$ .  
Are  $E$  and  $F$  some  $\mathbb{R}$ -vector spaces? Justify your answer.

**Exercise 2 (3 points)**

Let  $u = (2, 2, 6)$ ,  $v = (3, 1, -3)$  and  $w = (7, 5, 9)$ . Is  $\{u, v, w\}$  a linearly independent set of  $\mathbb{R}^3$ ? Justify your answer.

**Exercise 3 (3 points)**

Let  $E = \left\{ \begin{pmatrix} x \\ y \\ z \end{pmatrix} \in \mathbb{R}^3 \text{ such that } \begin{array}{lcl} x - 2y - z & = & 0 \\ 2x - 3y - 2z & = & 0 \\ -2x + 2y + 2z & = & 0 \end{array} \right\}$ . Write  $E$  as a spanned subspace, using the Span notation.