
Algebra2 Test N°02

Exercise 01: Consider the application

$$\begin{aligned} f : \mathbb{R}^2 &\rightarrow \mathbb{R}^2 \\ (x, y) &\mapsto (x + y, 2x + 2y). \end{aligned}$$

1. Prove that f is a linear application.
2. Determine a basis for its kernel, and its image.
3. Deduce that f is neither one to one nor onto.

Exercise 02:

Let the linear application f , such that

$$\begin{aligned} f : \mathbb{R}_2[X] &\rightarrow \mathbb{R}_2[X] \\ P(X) &\mapsto P(X + 1) - P(X). \end{aligned}$$

Determine the kernel of f , then its rank.