

Name:

1. Let $\mathbf{x} = (3, -1, 0, 2)$ and $\mathbf{y} = (2, 1, 1, 0)$.

(a) Find the distance between \mathbf{x} and \mathbf{y} .

(b) Calculate $\|\mathbf{x}\| + \|\mathbf{y}\|$.

2. Consider the set of all 2×2 matrices with addition defined in the usual way and scalar multiplication defined by

$$r \begin{pmatrix} a & b \\ c & d \end{pmatrix} = \begin{pmatrix} ra & b \\ c & d \end{pmatrix}.$$

Is this a vector space? Explain.