4. Norms

1. Show that
$$\left\| \begin{pmatrix} x \\ y \end{pmatrix} \right\| = |x| + 7|y|$$
is a norm on $\mathbb{R}^2$.

2. Show that
$$\|f\|_\infty = \max_{x \in [0,1]} |f(x)|$$
is a norm on the vector space $C([0,1])$ of all continuous functions.

3. Calculate the norm $\|A\|_\infty$ for $A = \begin{pmatrix} -2 & 4 \\ 7 & -1 \end{pmatrix}$.