Assignment 2

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1 Question 2.3

$d(\boldsymbol{x}, \boldsymbol{y}) = \|\boldsymbol{M}\boldsymbol{x} - \boldsymbol{M}\boldsymbol{z}\|$

$\boldsymbol{M} = \begin{pmatrix} 1 & 0 \\ 0 & 10 \end{pmatrix}$

In order to be a metric, the function d must satisfy the following conditions:

1. $d(\boldsymbol{x}, \boldsymbol{y}) \geq 0$
2. $d(\boldsymbol{x}, \boldsymbol{y}) = 0 \quad \text{iff } x = y$
3. $d(\boldsymbol{x}, \boldsymbol{y}) = d(\boldsymbol{y}, \boldsymbol{x})$
4. $d(\boldsymbol{x}, \boldsymbol{z}) \leq d(\boldsymbol{x}, \boldsymbol{y}) + d(\boldsymbol{y}, \boldsymbol{z})$

We check each condition in order:

1.1 i