Name: _____ Score (Out of 5 points):

1. (5 points) Let (X, d_X) and (Y, d_Y) be two metric spaces. Let $X \times Y$ be the Cartesian product of the sets X and Y, i.e., $X \times Y$ is the set

$$X \times Y = \{(x, y) \mid x \in X, y \in Y\}.$$

Prove that the following function defines a metric on $X \times Y$.

$$\begin{aligned} d : (X \times Y) \times (X \times Y) &\longrightarrow \mathbb{R} \\ d((x_1, y_1), (x_2, y_2)) &= d_X(x_1, x_2) + d_Y(y_1, y_2) \end{aligned}$$