Math Month Challenge 2022
Geodesic Puzzle

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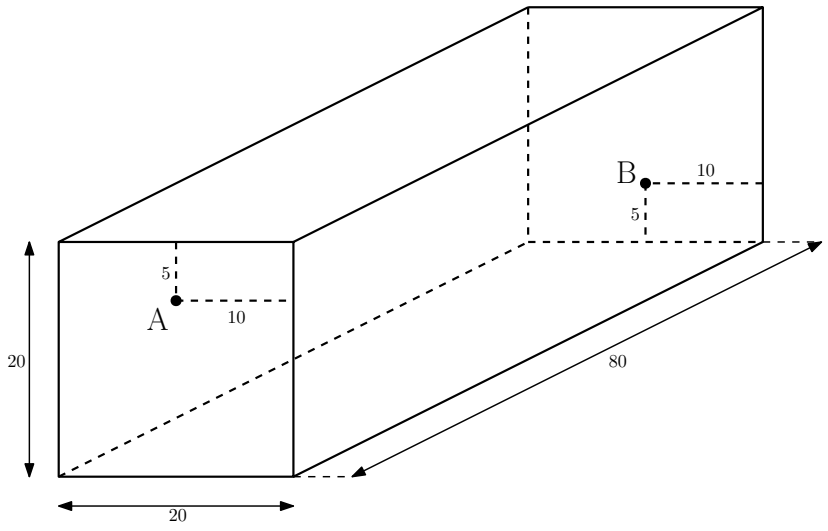
This puzzle deals with an alternative universe. Suppose you live on a world shaped like a rectangular box:



The name of the world is Boxworld and, for reference, the dimensions of this world are given in units of attoparsecs. Suppose you live at the point labeled A and need to travel to your friend's house at the point labeled B. Getting around Boxworld is simple: you can travel anywhere on its surface, but you cannot pass through its interior.

In terms of distance, what is the shortest path from your house at A to your friend's house at B? Remember - you can only travel on the surface of the Boxworld. Your solution should be the exact value of the shortest path. Can you also explain how you know there are no shorter paths possible?