5. [6 points] There are two towns A and B that are 2 and 5 miles away from a train track and
town B is 4 miles to the right of town A (see picture below). The railway company is
considering building a train station in between the two towns. The new station will be built
next to the train tracks and the local authorities have agreed to build roads directly
connecting the two towns to the station.
The picture below shows a map of the towns and the train track along with the distances and
a potential location of the station [the picture is not to scale]. Note that $x$ denotes the
distance (in miles) from the station to the point closest to Town A from the train track.

![Diagram of towns and train track]

a. [3 points] Find a formula for $D(x)$, the sum of the distances (in miles) from Town A to
the station and Town B to the station if the station is $x$ miles along the track to the
right of Town A. Circle the best answer.

   (i) $D(x) = \sqrt{2 + x^2} + \sqrt{5 + (4 - x)^2}$
   (ii) $D(x) = \sqrt{2^2 + x^2} + \sqrt{5^2 + x^2}$
   (iii) $D(x) = \sqrt{2^2 + (4 - x)^2} + \sqrt{5^2 + x^2}$
   (iv) $D(x) = \sqrt{2^2 + x^2} + \sqrt{5^2 + (4 - x)^2}$
   (v) $D(x) = \sqrt{2 + x} + \sqrt{5 + (4 - x)}$
   (vi) $D(x) = \sqrt{4^2 + x^2} + \sqrt{2^2 + (5 - x)^2}$

b. [3 points] The people who live in Town A negotiated a deal with the railway company
that guarantees the station will be within 3 miles of their town. The railway company
will build the station in between the two towns (to the right of Town A and to the left of
Town B). Given this information, what is the domain for of $D(x)$?

Answer: ______________________