Parabola Dancing   X04239_en
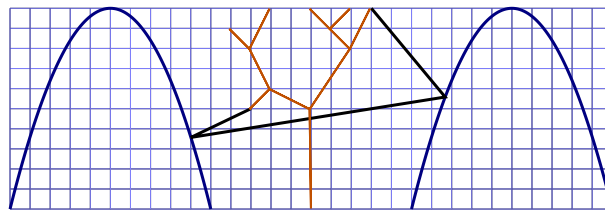
One of the most beautiful parks in Meashara contains a place that birds like very much. It is a nice tree, with two fountains to the left and to the right from it. Birds like to sit on the tree, and to fly into the stream of water from the fountains.

A bird is sitting on the tree, and wants to move to another spot on the tree, using as short path as possible. Calculate this shortest path.

Input

Input consists of several test cases (at most 20).

Each test case contains four numbers X_1, Y_1, X_2, Y_2. We have $100 \leq X_1, X_2 \leq 200$, $0 \leq Y_1, Y_2 \leq 100$. The left fountain produces a parabola-shaped stream, which goes through points (100,0), (50,100) and (0,0). Similarly, the right stream goes through (200,0), (250,100) and (300,0).

The input ends with 0 0 0 0.

Output

Output the length of the shortest path.

Sample input 1

```
120 50 180 100
0 0 0 0
```

Sample output 1

```
218.9
```

Problem information

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