6372 Stealing a Cake

There is a big round cake on the ground. A small ant plans to steal a small piece of cake. He starts from a certain point, reaches the cake, and then carry the piece back home. He does not want to be detected, so he is going to design a shortest path to achieve his goal.

The big cake can be considered as a circle on a 2D plane. The ant's home can be considered as a rectangle. The ant can walk through the cake. Please find out the shortest path for the poor ant.

Input

The input consists of several test cases.

The first line of each test case contains x, y, representing the coordinate of the starting point. The second line contains x, y, r. The center of the cake is point (x, y) and the radius of the cake is r. The third line contains x_1, y_1, x_2, y_2, representing the coordinates of two opposite vertices of the rectangle — the ant's home.

All numbers in the input are real numbers range from -10000 to 10000. It is guaranteed that the cake and the ant's home don't overlap or contact, and the ant's starting point also is not inside the cake or his home, and doesn't contact with the cake or his home.

If the ant touches any part of home, then he is at home.

Input ends with a line of '0 0'. There may be a blank line between two test cases.

Output

For each test case, print the shortest distance to achieve his goal. Please round the result to 2 digits after decimal point.

Sample Input

```
1 1
-1 1 1
0 -1 1 0
0 2
-1 1 1
0 -1 1 0
0 0
```

Sample Output

```
1.75
2.00
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