

# A

## Arc and Point

**Input:** Standard Input  
**Output:** Standard Output



Given a *circular* arc (i.e. part of the circumference of a circle) and a point P, your task is to calculate the shortest distance between them. That means, you should find a point on the arc, whose distance to P is minimized.

**Attention:** Try to use exact algorithms. Approximation algorithms are harder to pass the judge data.

### Input

There will be at most 10000 test cases. Each case contains 8 integers  $x_1, y_1, x_2, y_2, x_3, y_3, x_p, y_p$ . The arc starts from  $A(x_1, y_1)$ , goes through  $B(x_2, y_2)$  and ends at  $C(x_3, y_3)$ . The point is located at  $(x_p, y_p)$ . It is guaranteed that A, B, C are different points and will not be collinear. The absolute values of all coordinates are not greater than 20.

### Output

For each test case, print the case number and the distance, to three decimal places. Absolute error of 0.001 is allowed.

### Sample Input

### Output for Sample Input

```
0 0 1 1 2 0 1 -1
3 4 0 5 -3 4 0 1
```

```
Case 1: 1.414
Case 2: 4.000
```

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