Scene of Crime

Memory: 20KB

Time: 1 Second

After a ruthless crime is committed, the police visit a site and observe that there is a lot of evidence lying on the crime-scene. To protect the evidence from common people tress-passing the scene of crime, a police officer needs to quickly wrap a barricade tape on the peripheries of the crime scene. The policeman places a marker in the center of the crime scene and ties one end of the barricade tape to it. He then walks around the perimeter of the scene of the crime before finally coming back to the marker and ties the other end of the tape to it. To avoid wastage of tape, the police officer needs to determine the points such that the minimum amount of tape is used.

Task

Write code that will help the policeman determine the minimum length of tape that would be used to surround the crime scene. We suppose that the marker is placed at position (0,0), i.e., the center of the crime scene.

Input

The input begins with a line specifying the number of evidence points ranging from 1 to 10000 in the crime scene. This is followed by one line per evidence point with two real numbers specifying it's x-y positions relative to the marker placed at position (0,0).

Output

The output consists of a single number which is the length of barricade tape in metres, correct to

two decimal places.

Sample Input

6

1.0 1.0

-1.0 1.0

-1.0 -1.0

1.0 -1.0

-0.5 -0.5

0.5 -0.5

Sample Output

8.83