An Orange Lover

Description

You, the strongest magician, is the best friend of Suhorng, a happy tree friend that loves orange. Suhorng loves orange so much that he plans to plant some orange trees in his garden. Unfortunately, there are also some worms living in his garden that will eat oranges. In order to protect Suhorng's oranges, you plan to create a magic shield that will cover all the orange trees in the garden. However, the larger area you cover, the more mana you cost. Hence, you want to know how big the area that you need to cover is. You may regard orange tree as a point on the plane, so you don't need to worry about the area of a tree. Note that the magic shield should form a convex polygon.

Input

The file contains several test cases. Each test case begins with an integer n, each of the next n line contains 2 integers X, Y representing the coordinates of the orange tree Suhorng just planted.

- $3 \leq n \leq 1000$
- $|X|, |Y| \leq 10^9$

Output

Print n lines for each test case, where i-th line contains the area that you need to cover after Suhorng plants the i-th orange tree. Note that you should always output to the first decimal place.

Sample Input

```
5
0 0
0 2
2 0
1 1
2 2
3
0 0
1 1
2 2
```

Sample Output

```
0.0
0.0
2.0
2.0
4.0
0.0
0.0
0.0
```