
Weather report

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 256 megabytes

Have you ever experienced the feeling of having a flight canceled at the last moment because of bad weather conditions? It's really not cool! why couldn't they make better previsions, and avoid you travel to the airport?

In this problem, we will try to improve the weather prevision for some airports in a given region. In this region, there are N airports located at different points on a 2D plane. You are planning to construct some weather stations in the area, building stations improve the weather previsions for all airports located inside the **smallest convex regular polygon** that contains all of the weather stations.

You actually can build as many stations as you can, but building stations are expensive so you'd like to minimize the number of them. In case of equality, you also want the polygon to be as small as possible in order to optimize the weather prevision.

A polygon is regular when all angles are equal and all sides are equal.

Input

The input consists of multiple test cases, the first line contains the number of them. Each test case starts with one integer N the number of airports ($1 \leq N \leq 10^5$).

N lines follow, each containing two integers x_i and y_i denoting the position of airport number i ($-10^3 \leq x, y \leq 10^3$).

You are guaranteed that the N points are not co-linear.

Output

For each test case output one line containing one number: The minimum area of the polygon described in the problem statement with an absolute or relative precision of 10^{-3} . If there are no such polygons output -1.

Example

standard input	standard output
2	1.73205081
3	201.0362971
0 1	
0 -1	
1 0	
4	
0 0	
10 0	
0 10	
10 10	