	# 4062 - You are around me ... ## <u>Asia - Dhaka - 2007/2008</u>

A jano shohoj shikarokti ami jugantori noi,

Its my honest confession that I am not revolutionary

A jano bhishon akkhep amar ami digbijoee noi

And I also regret that I am not a world beater

Bindu ami tumi amaye ghire

I am a point and you surround me like an ellipse

Upobritter bhetor shudhu tumi achho

And no one else is there within

The above lines are taken from a super hit romantic song (A bit changed though) of Bangladesh. The left column shows the lines from original song and the column on the right shows somewhat a English translation of it. Arif is listening to this song after the end of his Casanova life. Last year we posed a problem in Dhaka Regional on   Mobile Casanova Arif .

After listening to this song about a hundred times (Roughly 7.5 hours continuously), a funny geometric thought came to Arif s mind: if every boy was at the center of an ellipse and if only one girl was placed in it for him, then he (Arif) would not have turned into Casanova. The girls of course cannot go out of the ellipse, the ellipses cannot intersect and the poor boy stuck at the center. Maintaining these constraints the ellipses should be as large as possible, so that the girls can gossip with one another, standing on the edge of their respective ellipses.

You will be given the Cartesian coordinates of at most 15000 boys, and the eccentricity and orientation of the ellipses. You will have to find the maximum possible area of the ellipses. All the ellipses should have same and maximum possible area, same eccentricity and orientation.
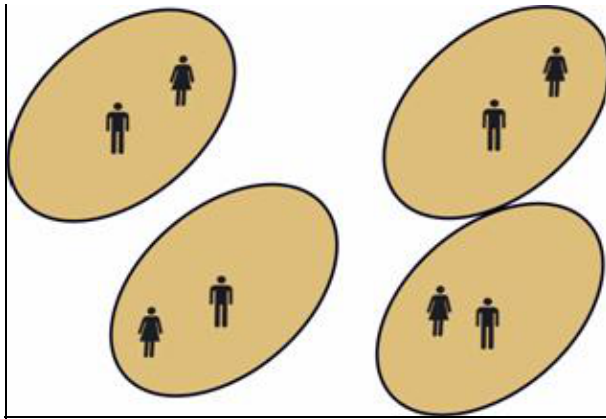

Fig 1: Above you can see four ellipses are drawn keeping four men at the center. In this orientation these ellipses have the maximum possible area.
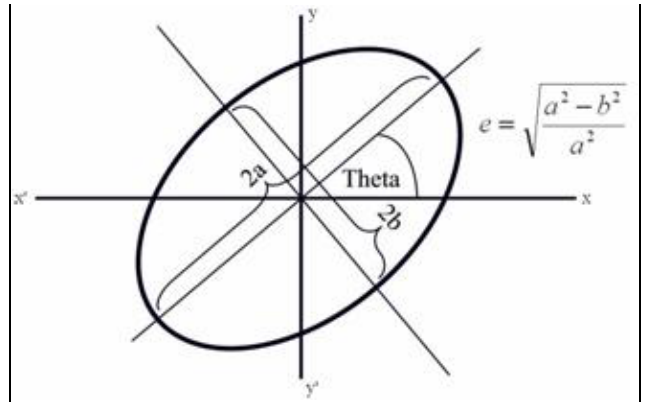

Fig 2: This figure shows an ellipse whose length of major axis is 2a, length of minor axis is 2b, and the major axis makes an angle theta with the horizon.

The eccentricity of the ellipse is $e = \sqrt{\dfrac{a^2 - b^2}{a^2}}$. The center of an ellipse is the intersection point of major axis and minor axis.

Input

The input file contains maximum 15 test cases. The description of each test case is given below:

First line of each test case contains one integer N (1<N<15001) and two floating-point numbers e (0.2<e≤1) and theta (-90<theta≤90, theta is in degree). Each of the next N lines contains two floating-point numbers which denote the coordinate of a boy.

Input is terminated by a line where the values of N, e and theta are zero.

Output

For each test case produce two lines of outputs. The first line contains the serial of output and the second line contains the maximum possible area of the ellipse. Print six digits after the decimal point. Errors due to precision problems will be ignored.

Sample Input

Output for Sample Input

Sample Input	Output for Sample Input
2 0.400000 10	Case 1:
100 100	15298.744584

200 200

0 0.000000 0

Problem setter: Shahriar Manzoor, Special Thanks: Derek Kisman

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