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1239 - Convex Fence

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Time Limit: 2 second(s)		**Memory Limit: 32 MB**	

I have a land consisting of **n** trees. Since the trees are favorites to cows, I have a big problem saving them. So, I have planned to make a fence around the trees. I want the fence to be convex (curves are allowed) and the minimum distance from any tree to the fence is at least **d** units. And definitely I want a single big fence that covers all trees.

You are given all the information of the trees, to be specific, the land is shown as a 2D plane and the trees are plotted as 2D points. You have to find the perimeter of the fence that I need to create as described above. And you have to minimize the perimeter.
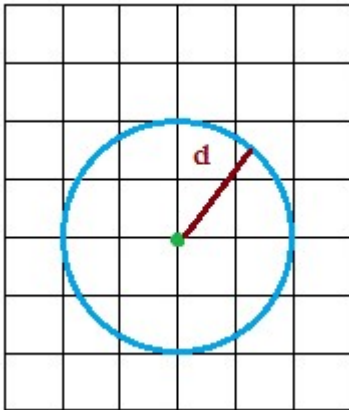
One tree, a circular fence is needed
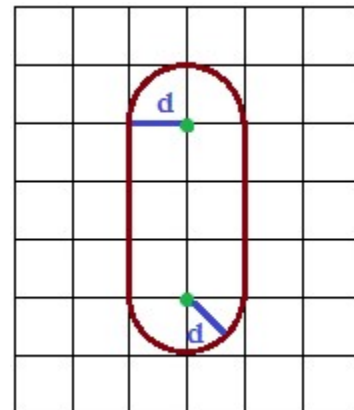
Two trees, the fence is shown

Input

Input starts with an integer **T (≤ 10)**, denoting the number of test cases.

Each case starts with a line containing two integers **n (1 ≤ n ≤ 50000)**, **d (1 ≤ d ≤ 1000)**. Each of the next lines contains two integers x_i y_i **(-10^8 ≤ x_i, y_i ≤ 10^8)** denoting a position of a tree. You can assume that all the positions are distinct.

Output

For each case, print the case number and the minimum possible perimeter of the fence. Errors less than **10^{-3}** will be ignored.

Sample Input	Output for Sample Input
3 1 2 0 0	Case 1: 12.566370614 Case 2: 12.2831853 Case 3: 48.4869943478

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

Note

Dataset is huge, use faster i/o methods.