

7145 Lawn Mower

At the begin of every year, farmer John needs to make his barren farmland full of vitality. In order to work more efficiently, he bought a lawn mower.

The farmland of farmer John is a simple polygon, surrounded by fences. The lawn mower is a circle-like machine which can fly, and it can clean all the weed under it as long as no fence in the area to be cleaned.

In geometry a simple polygon is defined as a flat shape consisting of straight, non-intersect line segments or “sides” that are joined pair-wise to form a closed path. If the sides intersect then the polygon is not simple.

Farmer John wants to know the area of weed the lawn mower can help him to clean.

Input

The first line of the input gives the number of test cases, T . T test cases follow.

Each test case begins with two numbers N and R , which indicates the number of fences the farmland has and the radius of the lawn mower.

Then N lines follows, i -th line contains two numbers x_i and y_i , which indicate the end points of the fences. The i -th fence ($1 \leq i < N$) ends of (x_i, y_i) , (x_{i+1}, y_{i+1}) , and the last fence ends of (x_1, y_1) , (x_N, y_N) .

Output

For each test case, first output one line containing ‘Case # x : y ’, where x is the test case number (starting from 1)

y will be considered correct if it is within an absolute or relative error of 10^{-6} of the correct answer.

Limits:

$$1 \leq T \leq 10,$$

$$1 \leq N \leq 100,$$

$$0 \leq R \leq 10^3,$$

$$|x_i|, |y_i| \leq 10^3,$$

It’s ensured that in testdata if we change the radius slightly bigger or smaller, e.g. 10^{-9} , the result will still be judged correctly.

Sample Input

```
1
4 1.0
0.0 0.0
3.0 0.0
3.0 3.0
0.0 3.0
```

Sample Output

```
Case #1: 8:14175927
```