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CTU Open Contest 2026

Rope

`rope.(c|cpp|py)`, `Rope.(java|kt)`

Míša was taking a peaceful afternoon stroll through the countryside when he stumbled upon a curious sight: a pasture dotted with stationary cows. By total coincidence — and for reasons he refuses to explain — Míša happened to be carrying a sturdy piece of rope of fixed length r. Never one to pass up a strange challenge, Míša wondered: if he tied the ends of the rope together to form a loop, how many cows could he herd together inside it? Help Míša figure out the maximum number of cows he can capture within a single loop of his rope.

Formally, the cows are points in the plane. Míša lays the rope on the ground as a closed curve of length at most r. The rope does not have to be stretched into a nice loop: it may touch or overlap itself, for example run along a segment and back. A cow is captured if it lies inside the area enclosed by the rope or directly on the rope. Find the maximum number of cows that can be captured.

In particular, a single cow can always be captured (the rope can be coiled around a single point), and two cows at distance d can be captured with a rope of length $2d$ by laying the rope along the segment between them and back (see Sample Input 2).

Input Specification

The first line contains two space-separated integers n and r ($3 \le n \le 100$, $1 \le r \le 10000$), the number of cows and the maximum length of the rope. Each of the next n lines contains two space-separated integer coordinates x and y of a cow ($-100 \le x, y \le 100$). It is guaranteed that no two points are equal and no three lie on a common line.

Guarantee: Replacing r with any value in $[r - 10^{-5}, r + 10^{-5}]$ does not change the maximum number of cows that can be captured.

Output Specification

Output a single line with an integer, the maximum number of cows Míša can capture.

Sample Input 1

```
4 7
0 2
2 0
2 2
0 0
```

Output for Sample Input 1

```
3
```

Sample Input 2

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

Output for Sample Input 2

```
2
```

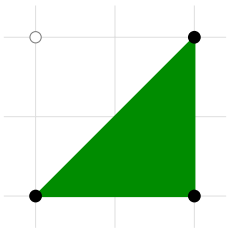

Illustration for sample input 1. The curve length is $4 + 2\sqrt{2} \leq r = 7$