Task: BCG
Backyard Cat Gang

AACPP WiSe 2025/26 Round 5 Memory: 64MiB 2025.12.17 – 2026.01.14

Something very suspicious is happening in Mat's backyard! His cat, Dexter, has been secretly burying his "treasures" – treats, toys, bottle caps, and mysterious objects Mat prefers not to think too hard about – in every corner of the garden.

One burying cat is already more than Mat wants to deal with. But the real disaster began when the neighbourhood cats discovered Dexter's stash. Night after night, they sneaked into the backyard, digging everywhere like furry little excavators. Plants toppled, flowerbeds collapsed, and Mat's once peaceful garden turned into a battlefield of pawprints and craters.

Enough was enough. To restore order, Mat set up **motion-activated scare toys** at several strategic points across the yard. They're harmless gadgets, but every cat *except* Dexter flees at the slightest beep or wiggle. (Dexter, of course, just sits there unimpressed.)

A point in the garden is considered **protected** if, when moving from that point in *any* direction, you get **closer to at least one toy** — meaning any sneaky cat would inevitably wander into one of the scare zones.

Recently, Mat bought **one more scare toy** to expand the protected area even further. He has several unused strategic points in mind, and for each one he wants to know: **How large will the protected area become if he places the new toy there?**

Input

The first line of standard input contains two integers, n and m, the number of devices already installed and the number of unoccupied strategic points, respectively.

Each of the next n lines contains two integers x_i, y_i, the coordinates of the i-th installed device on a 2D cartesian grid of the garden.

The final m lines contain the coordinates of the strategic points in the same format.

All listed points are distinct and the area protected by initially installed devices is non-zero.

Output

Your program should print exactly m lines to standard output. The i-th of these lines should contain the **total protected area** if a device was added at the i-th unoccupied strategic point. Each number must be printed with exactly one digit of precision after the decimal point, rounded down.

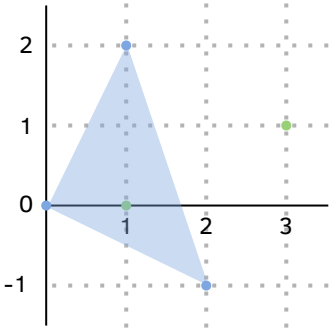
Example

Input

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

Output

```
5.0
2.5
```



Explanation: The blue points on the diagram are devices already set up, while green are the two candidate points. The blue shaded area is the area initially protected, equal to 2.5. Setting up a device at $(3, 1)$ would double the area. Setting a device at $(1, 0)$ does not increase the protected area.

Limits

Your solution will be evaluated on a number of hidden test cases divided into groups. Points for a group are awarded if and only if the submission returns the correct answer for each of the tests in the group within the allotted time limit. These groups are organised into subtasks with the following limits and points awarded.

Subtask	Limits	Points
1.	$3 \leq n \leq 10^3$, $m \leq 10^3$, $\lvert x_i \rvert, \lvert y_i \rvert \leq 10^3$	1
2.	$3 \leq n \leq 10^3$, $m \leq 10^3$, $\lvert x_i \rvert, \lvert y_i \rvert \leq 10^8$	2
3.	$3 \leq n \leq 10^5$, $m \leq 10^5$, $\lvert x_i \rvert, \lvert y_i \rvert \leq 10^8$	7