You start at point $(0, 0)$ and must reach point (p, q) on a flat field. Unfortunately there is a number of lasers you have to avoid. Each laser starts at a point (x, y) and shoots out an infinite one directional ray at radian angle θ from the x-axis. Given the position of the lasers, find the shortest path you can take without getting hit by a laser.

Input

A number of test cases (< 100).

For each test case, the first row is the three integer n, the total number of lasers, and the end point (p, q). The next n line, each has two integers x, y and a real number θ, describing the laser as defined above as position of laser and the angle with respect to the x-axis.

Note that $0 \leq n, p, |q|, |x|, |y| \leq 1000000$, $\theta \in [-\pi, \pi)$.

Output

For each test case, output the answer with 5 digits after decimal, on one line.

Sample Input

```
3 5 5
2 1 1
3 1 2
4 1 -1.5
3 5 0
5 2 1
5 2 2
5 2 -1.5
```

Sample Output

```
7.63441
5.00000
```