Night at the Museum 2

Input file:	`standard input`
Output file:	`standard output`
Time limit:	4 seconds
Memory limit:	1024 megabytes

A security guard patrols a museum to monitor exhibits. The patrol route is a closed polyline consisting of n points labeled from 1 to n, which are connected in order (the last point connects back to the first point) to form n consecutive segments. The guard patrols in the order $1 \to 2 \to \cdots \to n \to 1 \to \cdots$. When the guard is not at a segment endpoint, their field of view is a sector with radius $10^{10^{10^{10}}}$ and central angle $2a$, with the sector's bisector aligned with the forward direction of the patrol segment.

A point P on a patrol segment (endpoints exclusive) can see an exhibit at point Q if and only if Q lies within the sector region with apex at P. Given the closed polyline patrol route defined by n points and m exhibit locations, find the total length of patrol routes where all exhibits can be seen at the same time.

Input

There is only one test case in each test file.

The first line contains three integers n, m, and a ($3 \le n \le 2 \times 10^5$, $1 \le m \le 2 \times 10^5$, $0 < a < 90$), indicating the number of points of the closed polyline, the number of exhibits, and the half-angle of the field of view in degrees, respectively.

For the following n lines, the i-th line contains two integers x_i and y_i ($-10^9 \le x_i, y_i \le 10^9$), indicating the coordinates of the i-th point of the polyline. Consecutive points form patrol segments, and the last point connects back to the first point to form a closed loop. It is guaranteed that no two consecutive points (including the last and first points) are identical.

For the following m lines, the i-th line contains two integers x'_i and y'_i ($-10^9 \le x'_i, y'_i \le 10^9$), indicating the coordinates of the i-th exhibit.

Output

Output one line containing a real number, indicating the total length of patrol routes where all exhibits can be seen at the same time.

Your answer will be considered correct if its absolute or relative error does not exceed 10^{-6}. Formally speaking, suppose that your answer is a and the jury's answer is b, your answer is accepted if and only if $\frac{|a-b|}{\max(1,|b|)} \le 10^{-6}$.

Examples

standard input	standard output
3 2 45 1 1 5 5 8 1 2 3 4 2	4.4142135624
4 1 60 0 0 2 0 2 2 0 2 1 1	1.6905989232

Note

The first sample test case is illustrated below. A and B are the two exhibits, and G is the guard.