Paint Ball

John Doe wants to paint his roof. He recently bought this new thing on TV called the "Paint Ball." It absorbs paint, and when rolled along a surface, contours in such a way as to use all of the paint along its surface, leaving behind a perfect rectangle. They come in a bunch of different sizes and tensions, and a bonus feature: if the ball rolls over paint it has already laid down, it leaves it alone! That means the ball doesn't pick up any loose paint, or drop any of the paint it is currently carrying! What a tool!

Luckily for John, his roof is a flat polygon. That means he can roll his ball exactly as he pleases without it falling off the roof.

John experiments with the paint ball he has, and finds out the width of the rectangle and the radius of the ball. He needs to know how many times he has to recoat his ball before the entire roof is painted.
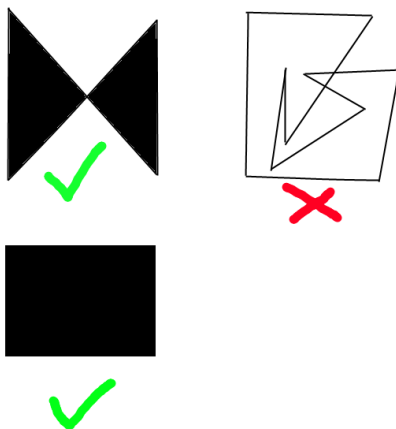
Input

Input begins with an integer on a single line, T, the number of times John will be painting his roof.

Each test case starts with a single line containing a floating point decimal R (the radius of the ball), and an integer P (the number of points representing the polygonal roof), all positive.

Following this line will be N lines, each of which is an ordered pair of floating point decimal numbers, separated by a single space. They will represent an edge of the polygon, and each edge will connect to the previous edge.

The last edge will connect to the first edge. The polygon can intersect itself. It will not overlap itself.

Output

Output will be a single integer per line, denoting the number of times John has to recoat the paint ball before his roof is completely painted.

Sample Input

2
1 4
0 0
0 5
5 5
5 0
1 4
0 0
0 10
10 5
5 0

Sample output

2
5