

## Problem D. Amazing spacecraft

Input file:            standard input  
Output file:           standard output  
Time limit:            3 seconds  
Memory limit:         128 megabytes

On this day, Sonetto purchased her first spacecraft (which can be considered as a convex polygon) and eagerly began to operate it. This spacecraft had a touch screen interface where the user could click on a position, and the spacecraft would instantly teleport to that location. However, since *Sonetto* bought a smuggled spacecraft, after Sonetto clicks on a location, the system randomly selects a point within a circle centered at Sonetto's clicked position with a radius of  $R$ , and the spacecraft teleports to that point. On this day, there was a Mr.Cookie's spacecraft parked in the vicinity, which can also be seen as a convex polygon. Now, given the position where Sonetto clicked on the screen, you are asked to calculate the probability of *Sonetto's* spacecraft colliding with Mr.Cookie's spacecraft parked in the area.

Because the space where Sonetto is located is a rather mysterious space, Sonetto's spacecraft may initially intersect with Mr.Cookie's spacecraft. However, we don't need to be concerned about Sonetto's initial position. We only need to focus on whether the position of her spacecraft **after the instant teleportation** will collide with Mr.Cookie's spacecraft.

To be more specific, you are given two convex polygons  $A$  and  $B$ , and a circle  $P$  (centered at point  $X$  with radius  $R$ ). You need to determine the probability of randomly selecting a point  $S$  within the circle  $P$ , such that when the convex polygon  $A$  moves along the vector  $OS$  ( $O$  is the origin point  $(0,0)$ ), it transforms into a new convex polygon  $A'$ , and  $A'$  intersects with  $B$  (intersection implies that there exists a point  $w$  such that  $w \in A'$  and  $w \in B$ ).

### Input

The input consists of multiple test cases. The first line contains a single integer  $t$  ( $1 \leq t \leq 1200$ ) — the number of test cases. Description of the test cases follows.

The second line contains an integer  $n$  ( $3 \leq n \leq 30000$ ), denoting the number of vertices of the convex polygon  $A$ .

Then follows  $n$  lines, each line contains two integers  $x_i, y_i$  ( $-10^8 \leq x_i, y_i \leq 10^8$ ), denoting the  $i$ th point of the convex polygon  $A$ . The points are given in counter-clockwise order.

The next line contains an integer  $m$  ( $3 \leq m \leq 30000$ ), denoting the number of vertices of the convex polygon  $B$ .

Then follows  $m$  lines, each line contains two integers  $x_i, y_i$  ( $-10^8 \leq x_i, y_i \leq 10^8$ ), denoting the  $i$ th point of the convex polygon  $B$ . The points are given in counter-clockwise order.

The last line contains three integers  $x, y$  and  $r$ , denoting the position of the center of the circle  $P$  and the radius of the circle. ( $-10^8 \leq x, y \leq 10^8, 1 \leq r \leq 10^8$ )

The data guarantees that the sum of  $n$  will not exceed  $2 \cdot 10^5$

The data guarantees that the sum of  $m$  will not exceed  $2 \cdot 10^5$

### Output

For each test case print a single floating-point number denoting the probability of  $A'$  intersects with  $B$ . (keep 4 decimal places)

## Example

standard input	standard output
2	0.5247
5	0.1185
0 -2	
4 -1	
4 0	
1 1	
0 0	
4	
0 -2	
3 -1	
2 1	
1 0	
-2 -2 3	
4	
-2 0	
-1 -2	
1 2	
-1 2	
3	
2 0	
5 1	
3 1	
1 -3 4	