

H - Hard Evidence

Input: standard input

Output: standard output

The young reporter Janne is planning to take a photo of a secret government installation. He needs to obtain evidence of the many serious crimes against good sense that are being committed there, so as to create a scandal and possibly win a Pulitzer.

Unfortunately, the base is surrounded by a high fence with high voltage wires running around. Janne does not want to risk being electrocuted, so he wants to take a photo from outside the fence. He can bring a tripod as high as the fence to take a photo, so if he wants he can stand right beside the fence and take his picture.

The secret installation is a convex polygon. The fence has a form of a circle. Of course Janne wants to make a photo with maximal possible detail level. The detail level of the photo depends on the view angle of the base at the point from which the photo is taken. Therefore he wants to find a point to maximize this angle.

Input

The first line of the each test case contains two integer numbers: n and r (the number of vertices of the polygon and the radius of the fence ($3 \leq n \leq 200$, $1 \leq r \leq 1000$)). The following n lines contain two real numbers each (the coordinates of the vertices of the polygon listed in counterclockwise order). It is guaranteed that all vertices of the polygon are strictly inside the fence circle, and that the polygon is convex. The center of the fence circle is located at the origin, $(0, 0)$. The end of the input is indicated when $n = 0$ and $r = 0$.

Output

For each test case, output the maximal view angle a for the photo ($0 \leq a < 2 \cdot \pi$), rounded to five decimal digits.

Sample Input

```
4 2
-1.0 -1.0
1.0 -1.0
1.0 1.0
-1.0 1.0
0 0
```

Sample Output

```
1.57080
```