

Problem I

Encircling Circles

Input: Standard Input
Time Limit: 30 seconds

You are given a set of circles C of a variety of radii (radiuses) placed at a variety of positions, possibly overlapping one another. Given a circle with radius r , that circle may be placed so that it encircles all of the circles in the set C if r is large enough.

There may be more than one possible position of the circle of radius r to encircle all the member circles of C . We define the region U as the union of the areas of encircling circles at all such positions. In other words, for each point in U , there exists a circle of radius r that encircles that point and all the members of C . Your task is to calculate the length of the periphery of that region U .

Figure I.1 shows an example of the set of circles C and the region U . In the figure, three circles contained in C are expressed by circles of solid circumference, some possible positions of the encircling circles are expressed by circles of dashed circumference, and the area U is expressed by a thick dashed closed curve.

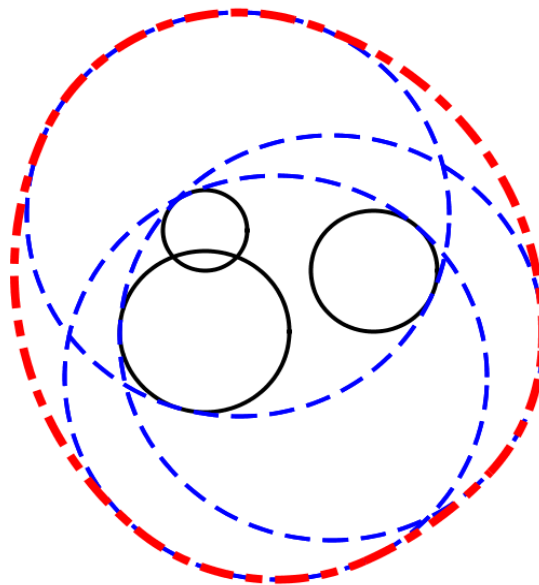


Figure I.1: Example of the Circle Set

Input

The input is a sequence of datasets. The number of datasets is less than 100.

Each dataset is formatted as follows.

```
 $n$      $r$   
 $x_1$   $y_1$   $r_1$   
 $x_2$   $y_2$   $r_2$   
 $\vdots$   
 $x_n$   $y_n$   $r_n$ 
```

The first line of a dataset contains two positive integers, n and r , separated by a single space. n means the number of the circles in the set C and does not exceed 100. r means the radius of the encircling circle and does not exceed 1000.

Each of the n lines following the first line contains three integers separated by a single space. (x_i, y_i) means the center position of the i -th circle of the set C and r_i means its radius.

You may assume $-500 \leq x_i \leq 500$, $-500 \leq y_i \leq 500$, and $1 \leq r_i \leq 500$.

The end of the input is indicated by a line containing two zeros separated by a single space.

Output

For each dataset, output a line containing a decimal fraction which means the length of the periphery (circumferential length) of the region U .

The output should not contain an error greater than 0.01. You can assume that, when r changes by ϵ ($|\epsilon| < 0.0000001$), the length of the periphery of the region U will not change more than 0.001.

If r is too small to cover all of the circles in C , output a line containing only 0.0.

No other characters should be contained in the output.

Sample Input

```
1 10  
5 5 7  
2 12  
5 5 7  
8 6 3  
3 10  
3 11 2
```

2 1 1
 2 16 3
 3 15
 -5 2 5
 9 2 9
 5 8 6
 3 38
 -25 -10 8
 30 5 7
 -3 35 11
 3 39
 -25 -10 8
 30 5 7
 -3 35 11
 3 800
 -400 400 2
 300 300 1
 300 302 1
 3 800
 400 -400 2
 300 300 1
 307 300 3
 8 147
 130 80 12
 130 -40 12
 -110 80 12
 -110 -40 12
 70 140 12
 70 -100 12
 -50 140 12
 -50 -100 12
 3 493
 345 154 10
 291 111 75
 -275 -301 46
 4 55
 54 0 1
 40 30 5
 27 36 10
 0 48 7
 3 30
 0 3 3
 -3 0 4
 400 0 3
 3 7
 2 3 2
 -5 -4 2

```

-4 3 2
3 10
-5 -4 5
2 3 5
-4 3 5
4 6
4 6 1
5 5 1
1 7 1
0 1 1
3 493
345 154 10
291 111 75
-275 -301 46
5 20
-9 12 5
0 15 5
3 -3 3
12 9 5
-12 9 5
0 0

```

Output for the Sample Input

```

81.68140899333463
106.81415022205297
74.11215318612639
108.92086846105579
0.0
254.85616536128433
8576.936716409238
8569.462129048667
929.1977057481128
4181.124698202453
505.09134735536804
0.0
46.82023824234038
65.66979416387915
50.990642291793506
4181.124698202453
158.87951420768937

```

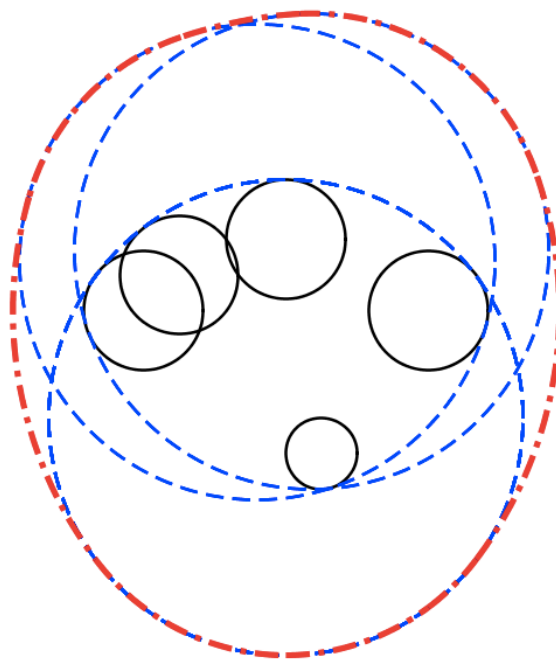


Figure I.2: Last Dataset of the Sample Input