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**Rose windows**

**P91283\_en**

Segon Concurs de Programació de la UPC - Final (2004-09-29)

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Mr. Arnold Gerald Nostik is in charge of the design of the main rose window of the new cathedral in his town. The rose window is circular,  $2r$  units wide. Since Mr. A. G. Nostik knows little about Virgins, Saints and Angels, he is thinking about a geometric pattern. Let  $n$  be an even integer number, at least 4. Mr. Nostik plans to pick  $n$  points, each at distance  $r$  of the center of the window, these points being the vertices of a regular polygon. (The next page shows an example with  $n = 8$ .) These points are to be joined with straight lines, and the resulting regions colored (with arbitrary colors) as shown in the example. Note that for  $n = 8$  there are four regions. We number these regions 1, 2, 3 and 4 starting to count from the center of the rose. In general, there are  $n/2$  regions.

Write a program to help Mr. Nostik to know how much glass of every color he needs in order to build a given rose window.

**Input**

Input begins with a number  $t$ . Follow  $t$  cases, each with a real number  $r$ , an even integer number  $n$ , and an integer number  $k$ . Assume  $1 \leq r \leq 100$ ,  $4 \leq n \leq 40$ , and  $1 \leq k \leq n/2$ .

**Output**

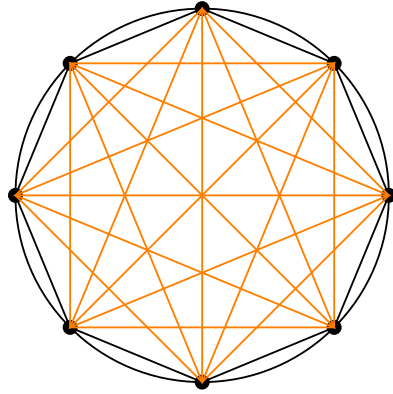
For every case, print the area of the  $k$ -th region of a rose window with  $n$  points and radius  $r$ , with four digits after the decimal point. The input cases have no precision issues.

**Sample input**

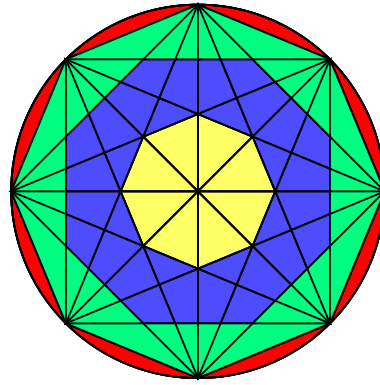
```
4
50 8 3
9.238794 8 2
10 4 1
20 4 1
```

**Sample output**

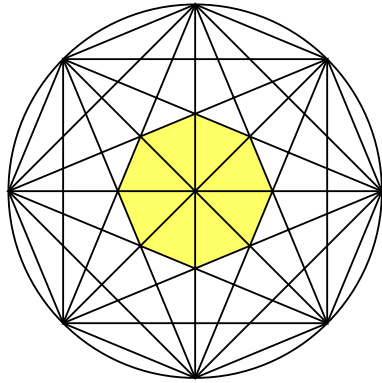
```
2928.9322
100.0000
200.0000
800.0000
```



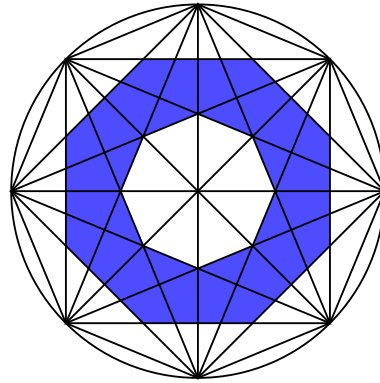
A regular octagon inside a circle



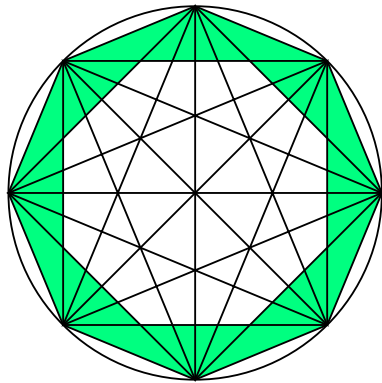
A rose window with 8 points



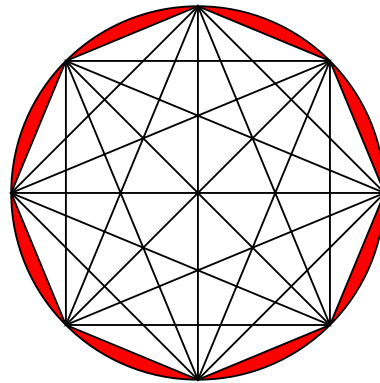
First region of the rose above



Second region of the rose above



Third region of the rose above



Fourth region of the rose above

### Problem information

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