

Area of the Devil

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 1024 megabytes

Given a circle with radius r , there are five points A_i ($i = 1, 2, \dots, 5$) arranged counterclockwise on the circle, and connecting them in the order of $A_1 - A_3 - A_5 - A_2 - A_4 - A_1$ forms a pentagram. We call the above connection order the **pentagram order**. By slightly adjusting the arrangement, a reversed pentagram, which is the symbol of the devil, can be obtained.

However, the devil thinks this pattern is too rigid. It believes that each vertex of this pentagram should be movable in order to summon the devil. Therefore, the devil will let A_i move on the circumference of a certain circle. Formally, consider the following five sets of points:

$$S_i = \{(x, y) \mid x = r \cos \theta, y = r \sin \theta, \theta_{s_i} \leq \theta \leq \theta_{t_i}\}, i = 1, 2, \dots, 5$$

where $\theta_{s_i}, \theta_{t_i}$ are the left and right endpoints of the range of polar angles in which the point A_i can move. Selecting A_i from S_i (it's guaranteed that there is no intersection between S_i and they are arranged counterclockwise), and connecting them in the pentagram order forms a pentagram. For a point P on the two-dimensional plane, if there exists a point A_i in S_i , and P is inside the pentagram formed by these five points, it is called a devil seal point. What is the area of the set of points formed by all devil seal points? The pentagram formed by the five points refers to the pentagram formed by connecting them in the **pentagram order**.

The devil has T such questions to ask you. If you cannot answer quickly, it will curse you to draw the devil card the next time you draw a tarot card.

Input

The first line contains an integer T ($1 \leq T \leq 10^4$) representing the number of test cases.

Each test case consists of three lines. The first line contains an integer r ($1 \leq r \leq 10^3$), the second line contains five integers, where the i -th integer represents θ_{s_i} ($0 \leq \theta_{s_i} \leq 359$), and the third line contains five integers, where the i -th integer represents θ_{t_i} ($0 \leq \theta_{t_i} \leq 359$). The angles above are in **degree** form and represent the five sets of points mentioned in the problem.

It is guaranteed that there is no intersection between the sets of points, and they are arranged counterclockwise, i.e., $\theta_{s_i} \leq \theta_{t_i}$ ($i = 1, 2, \dots, 5$), and $\theta_{t_i} < \theta_{s_{i+1}}$ ($i = 1, 2, \dots, 4$).

Output

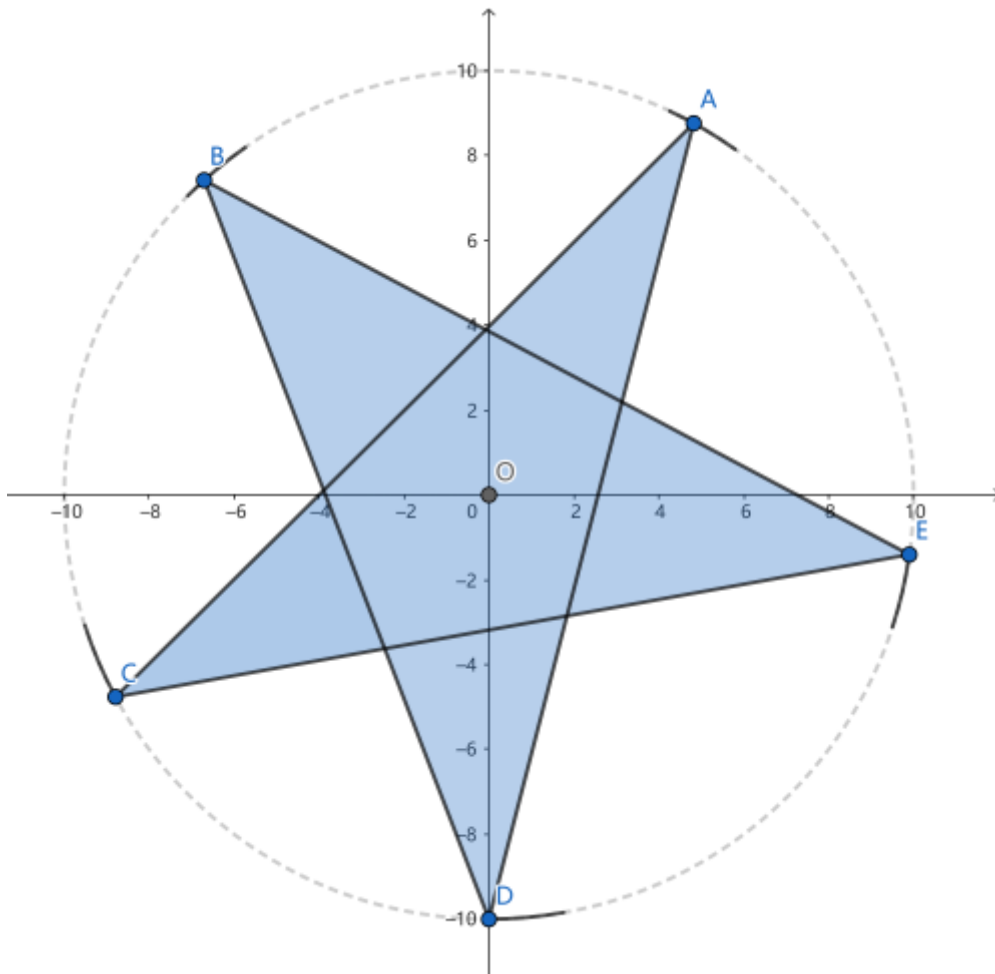
For each test case, output a real number representing the area of all possible locations where the devil seal point P may appear. Your answer will be considered correct only if the relative or absolute error between your answer and the correct answer does not exceed 10^{-6} .

Example

| standard input | standard output |
|--------------------|-----------------|
| 2 | 112.256994145 |
| 10 | 168.007261527 |
| 54 126 198 270 342 | |
| 54 126 198 270 342 | |
| 10 | |
| 54 126 198 270 342 | |
| 64 136 208 280 352 | |

Note

The first example gives the area of the inscribed regular pentagon with a radius of 10. The image following shows a possible pentagram of the second example, where the five solid line arcs are the five sets of points for example two.



Please note that reading in a large number of floating-point numbers will cause an I/O slowdown.