# Problem E - The Puzzle Room

Description

Mr. Jerry S. is passionate about wodden puzzles. He wants to exhibit some of his favourite puzzles from his collection in one of the many rooms in his house. Because they are so valuable to him, he wants to put some cameras around the room to surveil his collection. Given that there are so many different rooms, so many possible locations for the cameras and so many types of cameras, he decided to use an optimisation software to automatically test several of these combinations and tell him the best choice. However, in order to use this software, he needs a way to evaluate how good each possible configuration is (shape of the room, types of camera used and in which locations). One possibility would be to consider the total area that is covered by the cameras; the larger the area, the better. For this reason, he needs a program to measure the room area as well as how much of it is covered by the cameras.

The Task

You will be given a (convex-) room shape as well as the position and the field of view (area) of each camera. You have to measure the area under surveillance as well as the room area. The following figures show two rooms and the area covered by the cameras.
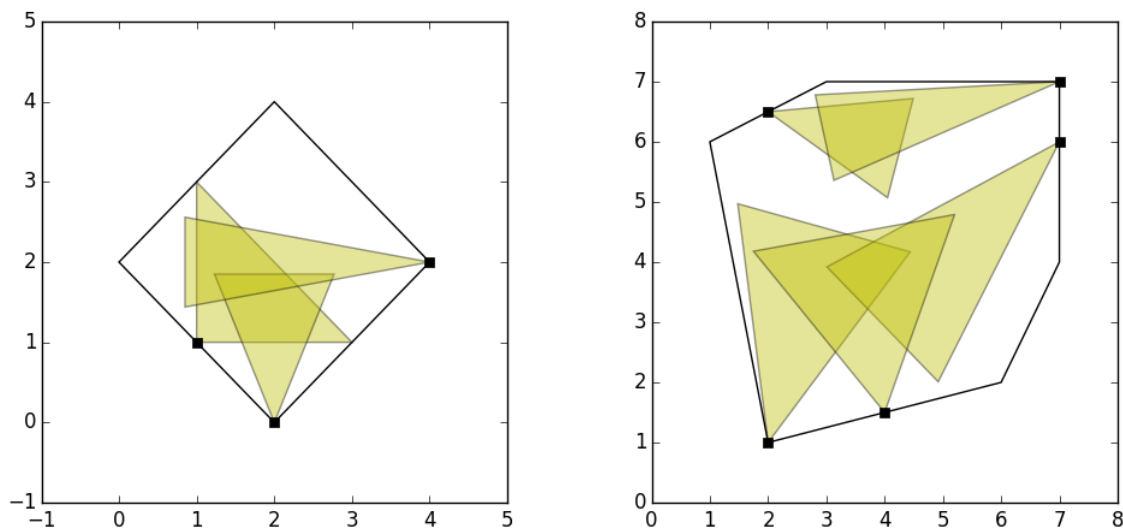

Note: You can assume that the area under surveillance is completely inside the

room.

Input

The first line contains the number of test cases, T. For each test case, the first line contains two numbers, V and C, representing the number of corners (vertices) of the room and the number of cameras, respectively. Then, $V+C$ lines follow. The first V lines contain the location of the room corners, in clockwise order, and is given by two numbers representing the x and y coordinates. Each of the last C lines contain 5 number (X, Y, O, A and D). X and Y represent the x and y coordinates of a camera location (which is always on a corner or at a wall of the room). O and A represent the orientation and angle vision of a camera, respectively, in degrees. Finally, D represents the maximum range of the camera (see Figure).
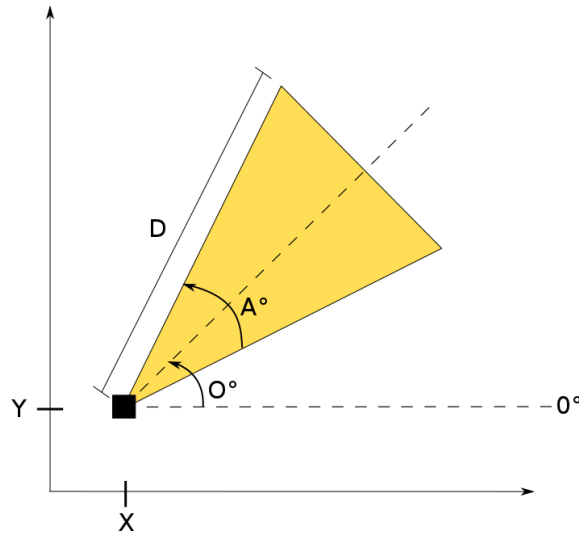
Output

For each test case, print the area of the room and the area covered by the cameras rounded to 6 decimal digits.

Constraints

- $T \leq 10$
- $V \leq 10$
- $C \leq 20$

Example

Example input:

```
2
4 3
0.0 2.0
2.0 4.0
4.0 2.0
2.0 0.0
1 1 45 90 2
2 0 90 45 2
4 2 180 20 3.2
6 5
1.0 6.0
3.0 7.0
7.0 7.0
7.0 4.0
6.0 2.0
2.0 1.0
2.0 6.5 -15 40 2.5
2.0 1.0 75 45 4
7.0 6.0 -135 35 4.5
4.0 1.5 100 60 3.5
7.0 7.0 -167 20 4.2
```

Example output:

```
8.000000 3.379749
28.500000 15.493631
```