

Problem C - Convex Hull

David is playing a medieval defence game on another arcade machine. In this game all the buildings in his city are perfectly circular buildings of radius 1.

David wants to build a convex wall around the city, because what city has an outer wall that isn't convex? Walls are expensive so help David figure out what the smallest length of wall he needs to surround his city, and how much area is enclosed by the wall.

The walls David builds don't need to be straight.

Input

The first line of the input contains a single integer, T , the number of test cases.

Each test case begins with a single line containing an integer n ($1 \leq n \leq 100,000$) the number of buildings in David's city.

The following n lines each describes the location of the i -th camp by two integers $x_i y_i$ ($10^4 x_i, y_i 10^4$).

Output

For each test cases, output two floating point numbers rounded to exactly two decimal places: the perimeter and the area of the smallest convex set that covers all the (circular) buildings.

You can assume that answer will not land within 10^6 of an odd multiple of 0.005 so default rounding in your programming language would give the correct answer.

Sample Input

```
1
4
0 0
0 1
1 0
1 1
```

Sample Output

```
10.28 8.14
```
