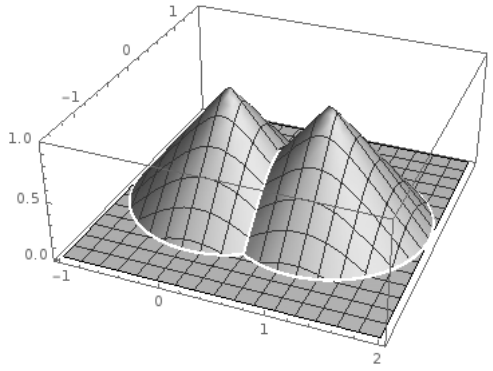
Problem A. Cones

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	256 megabytes

Here is a simple geometry problem: calculate the volume of union of identical cones. These cones are located on the $z = 0$ plane. A cone at $(x_0, y_0, 0)$ is defined as $\{(x, y, z) \mid 0 \le z \le 1 - \sqrt{(x - x_0)^2 + (y - y_0)^2}\}$. Given the locations of cones, (x_k, y_k), calculate the volume of the union of these cones.



Input

The first line of the input gives the number of test cases, T ($1 \le T \le 100$). T test cases follow.

Each case starts with a line of a single integer N ($1 \le N \le 1000$), indicating the number of cones, then N lines follow. Each line contains two real numbers x_k and y_k with 4 digits after decimal point indicating the location of the k^{th} cone, where $-20.0 \le x_k, y_k \le 20.0$, and no two points will be coincided.

For at least 90% test cases, it is guaranteed that $N \le 300$.

Output

For each test case, output one line containing "`Case x: y`", where `x` is the test case number (starting from 1) and `y` is the volume of the union of the cones. Your answer will be considered correct if it is within an absolute or relative error of 10^{-6} of the correct answer.

Example

standard input	standard output
4 1 0.0000 0.0000 2 0.0000 0.0000 1.0000 0.0000 3 -4.1850 0.8550 3.8150 4.0400 2.1300 -2.6700 5 5.6422 7.8467 -5.7704 9.1233 -1.2843 5.2843 3.8242 -2.2140 -4.6870 1.8571	Case 1: 1.047197551196598 Case 2: 1.863867179374688 Case 3: 3.141592653589793 Case 4: 5.235987755982988