Grazing Goats - MathGames

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Difficulty: ★ ★ ★ ★ ★
Key words: Geometry

A herd of n goats are grazing in an infinitely large field near Utrecht. Goat i is connected to its own post by a rope of finite length r_i, so that each goat can graze all the grass in a circle of radius r_i around its post. To ensure each goat has something to eat, the posts are placed in such a way that each goat at least has some section of the field (of positive area) to itself. Given all rope lengths and the location of each post, what is the total area that the goats can graze together?

Input

- The first line contains a single integer $1 \leq n \leq 100$, the number of goats.
- Next follow n lines describing a goat, each containing three space-separated integers $1 \leq r_i \leq 10^5$, $-10^5 \leq x_i, y_i \leq 10^5$, the length of the rope and the position of the post, respectively.

Output

- The total area that can be grazed by the goats. Your answer should have a relative error of at most 10^{-6}.

Examples

Input	Output
1 1 0 0	3.14159265

Input	Output
3 4 3 0 4 -3 0 3 0 6	120.77932148