Problem A. A Bite of Teyvat

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	512 megabytes

Xiangling, one of the greatest chef in Teyvat, is preparing for the Moonchase banquet. Xiangling has bought n round plates and her friend and companion Guoba will help place these n plates on the table in a line. The i-th plate placed has radius r_i and the center of this plate locates at $(x_i, 0)$ on the table.

However, Paimon the emergency food has been tired of waiting for the banquet a long time and begins finding the total area covered by the plates on the table after each placement.

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Input

The first line contains an integer n $(1 \le n \le 10^5)$, indicating the number of plates Xiangling has bought.

Then follow n lines, the i-th of which contains two integers x_i $(-10^5 \le x_i \le 10^5)$ and r_i $(1 \le r_i \le 10^6)$, indicating that the i-th plate placed by Guoba has radius r_i and the center of this plate locates at $(x_i, 0)$ on the table.

Output

Output n lines, the i-th of which contains a real number, indicating the total area covered by the plates on the table after Guoba places the first i-th plates.

Your answer is acceptable if its absolute or relative error does not exceed 10^{-9}. Formally speaking, suppose that your output is x and the jury's answer is y, your output is accepted if and only if $\frac{|x-y|}{\max(1,|y|)} \le 10^{-9}$.

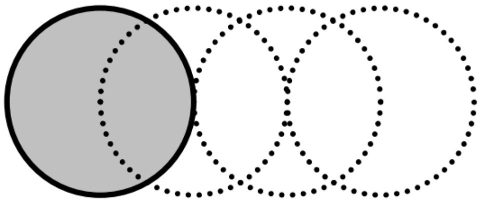
Example

standard input	standard output
4 0 1 2 1 3 1 1 1	3.141592653589793 6.283185307179586 8.196408262160623 8.881261518532902

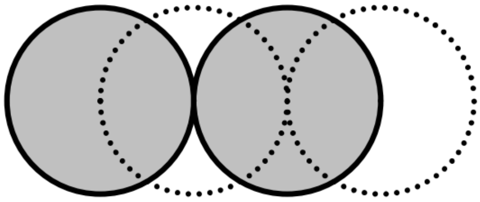
Note

In the sample case:

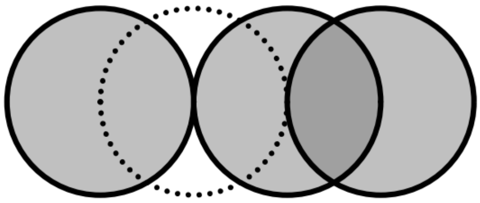
1. The total area covered by the first plate is π;



2. The total area covered by the first two plates is 2π;



3. The total area covered by the first three plates is $\frac{14\pi+3\sqrt{3}}{6}$;



4. The total area covered by all the four plates is $\frac{4\pi+3\sqrt{3}}{2}$.