

Problem M – Maximizing the Sauce

Soto is a big fan of movies, and as such, he likes to go to the cinema. The thing he likes most about the cinema is the sauce, and he wants to take as much as possible. The manager knows this and has made a new rule. People can only take N cups of sauce.

But even with this rule, Soto wants to get as much sauce as possible. To do so, he plans to change the form of the cups so they are able to hold the most possible sauce. A cup of sauce can be seen as an isosceles trapezium rotated by the center of the base. We then consider the smallest of the two obtained circles as the base of the cup.

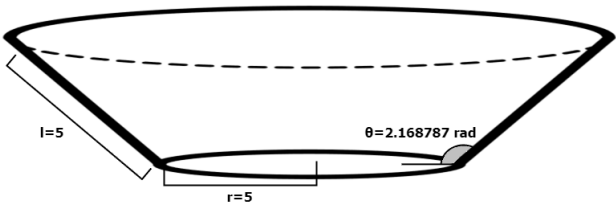


Figure 1. Answer for the first sample.

The base of cup i has a radius r_i , and sides of length l_i . Soto can choose to change the angle of the sides of the cup to be whatever he wants. Help him find the angle that maximizes the volume of sauce he can put on the cup. However, the sizes of the cups are all different, so he will ask you N questions.

Input

On the first line, you will be given an integer N ($1 \leq N \leq 10^5$), the number of cases.

On the next N lines you will be given two integers l_i and r_i ($1 \leq l_i, r_i \leq 10^4$), the length of the sides, and the radius of the base of the cup.

Output

You must print N different lines. On the i -th line you should print a real number indicating the angle in radians that maximizes the volume of the cup. Your answer will be accepted if its absolute or relative error does not exceed 10^{-6} . formally, if p is your answer, and j is the jury's answer, this should hold: $\frac{|p-j|}{\max\{1, |j|\}} \leq 10^{-6}$.

Sample input 1	Sample output 1
3	2.16878769
5 5	1.75225402
10 53	2.42506475
1000 235	