# Painting Hat

In preparations for Jeffroy's birthday party, his mom, named Cirsie, assigns her employees to paint the hats to be used in the party. Each hat is cone shaped with height H and radius R. Cirsie and her employees then go to the store to buy the paint. Since there is no container for the paint, all bought paint will be stored inside each hat.

Here is how the paint is stored:
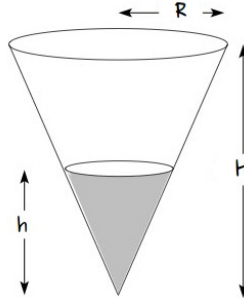
It is known that 1 unit of paint volume is enough to paint exactly 1 unit of hat area. To be as efficient as possible, all bought paint must be used to paint the hat. Each hat will be filled with paint until it reaches a height h. All the paint inside the hat must be used to paint that hat inside and out (ignore depth). Part of the hat that have been submerged in paint don't need to be painted. If the hat can't contain enough paint, it's filled until it's full.

Input

First line is N, number of birthday parties ($1 \leq N \leq 10000$). Next N line contains the hat used in each birthday party, containing 2 integers R and H ($1 \leq R, H \leq 100$)

Output

For each birthday party, output h, the height of paint that Cersei bought. Output until 6 digit after decimal point.

Example

Input:
3
4 6
6 4
2 10

Output:
5.874692
3.916461
10.000000