Coin Tosses

You have an unbiased coin which you want to keep tossing till you get N consecutive heads. You've already tossed the coin M times already and surprisingly, all tosses resulted in heads. What is the expected number of tosses needed till you get N consecutive heads?

For example, if N = 2 and M = 0. You need to keep tossing the coin till you get 2 consecutive heads. It is not hard to show that on an average, 6 coin tosses are needed.

As another example, if N = 2 and M = 1. You need 2 consecutive heads and have already got 1. In your first toss, if you get get a heads, you are done. Otherwise, you need to keep tossing the coin till you get 2 consecutive heads. The expected number of coin tosses is thus 1 + (0.5 * 0 + 0.5 * 6) = 4.0

Input

The first line contains the number of cases T. Each of the next T lines contains two numbers N and M.

Output

Output T lines containing the answer for the corresponding test case. Print the answer rounded to exactly 2 decimal places.

Constraints

1 <= T <= 100

1 <= N <= 1000

0 <= M <= N

Sample

Input:
4
2 0
2 1
3 3
3 2

Output:
6.00
4.00
0.00
8.00

Explanation

The first two samples are explained above. For the third case, you already have got 3 heads, so you do not need any more tosses.