Assignment Problem

Calvin has a math assignment at school where he has to evaluate a lot of expressions. Calvin decides to not to waste much of his time. There are M expressions overall. By looking at Susie's answers, Calvin has figured that the answers to all questions form a non decreasing sequence.

He decides that all his answers are going to be between 1 and N (inclusive). He fills his answer sheet with a random non-decreasing sequence of length M where each element is between 1 and N.

Here is the part where the real problem starts for Calvin. He does not want to choose a large value of N, because, he will have a lot of options to choose from. Also, if he chooses a very small value of N, a lot of answers would become equal and the teacher will become suspicious.

If $x = \max_{1 \le i \le N}(f(i))$, f(i) being the frequency or number of times i occurs in the sequence of M values he picked. Calvin wants to find out expected value of x. Help him solve the problem.

For example, if $M = 3$ & $N = 3$, the possible sequences are:

```
1 1 1 (x = 3)
1 1 2 (x = 2)
1 1 3 (x = 2)
1 2 2 (x = 2)
1 2 3 (x = 1)
1 3 3 (x = 2)
2 2 2 (x = 3)
2 2 3 (x = 2)
2 3 3 (x = 2)
3 3 3 (x = 3)
```

expected value of $x = 2.2$

Input Format

The first line contains an integer T which refers to the number of test cases. T lines follow, each containing 2 numbers, M and N for the corresponding test cases.

Constraints

$1 \le T \le 15$
$1 \le M \le 250$
$1 \le N \le 10^9$

Output Format

Output T lines, each containing answer to the corresponding test case. Error of upto 10^{-3} is allowed.

Sample Input

```
4
1 5
3 3
2 9
9 6
```

Sample Output

```
1.0000000000
2.2000000000
1.2000000000
4.3146853147
```

Explanation

For second testcase we have

Seq	Freq
111	3
112	2
113	2
122	2
123	1
133	2
222	3
223	2
233	2
333	3

$$
\begin{aligned}
E(x) &= \sum P_x \times x \\
&= P_1 + 2P_2 + 3P_3 \\
&= \frac{1}{10} + \frac{2 \times 6}{10} + \frac{3 \times 3}{10} \\
&= \frac{22}{10}
\end{aligned}
$$