Problem L
GoogolPlex
Time Limit: 1 second

Googolplex is a large number equal to $10^{10^{100}}$. Let G denote the number Googolplex. During his free and lonely time, Harry usually plays the Googolplex-game. First, he setups the Googolplex-game as follows:

- Harry draws $2 \times G$ squares on a straight line, numbered from 0 to $2 \times G - 1$ from left to right.
- Harry marks squares numbered $G+1$, $G+2$, ..., $G+m$ as "bad squares"
- Harry creates a dice with N faces, numbered 1 to N. When Harry throws the dice, each face has an equal probability of coming on top.
- Harry puts a stone on the square numbered 0.

Then, the Googolplex-game is played as follows:

- In each turn, Harry throws the N-face dice. If number f comes on top, Harry moves the stone f squares to the right.
- Harry repeats this process until he can no longer move the stone.

What is the probability that Harry WILL NOT move to a "bad square" during the game?

Input

The first line of the input contains the only positive integer T ($1 \leq T \leq 10^5$) - the number of test cases. Then T lines follow, each line contains 2 integers N and M ($1 \leq M$; $N \leq 10^9$).

Output

For each test case, print one line containing the probability that Harry DO NOT move to a "bad square" during the game. Your answer will be considered correct if the relative or absolute error is at most 10^{-6}.

Sample Input

```
2
2 1
2 2
```

Sample Output

```
0.33333333333333333333
0
```