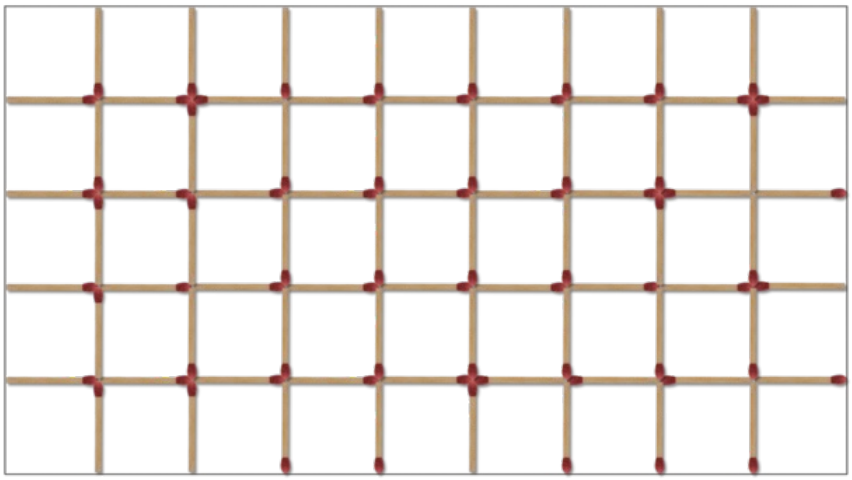
The Matchstick Experiment

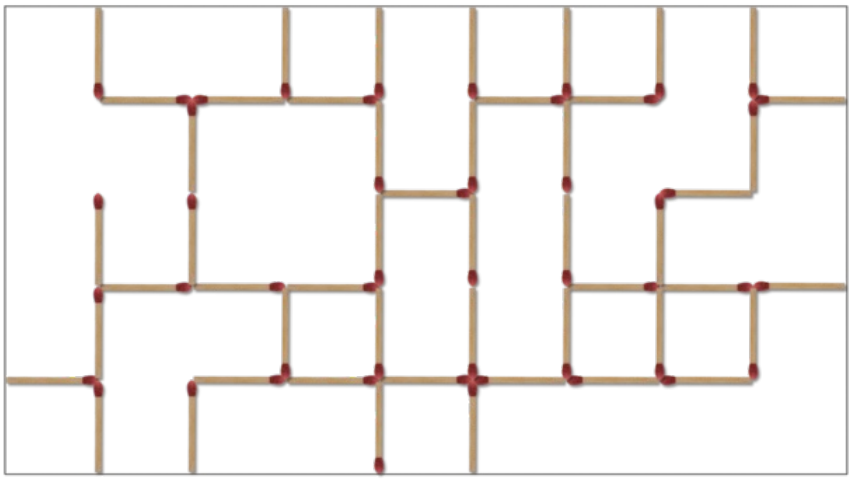
In an $n \times m$ grid, $2 \cdot n \cdot m - n - m$ matchsticks are placed at the boundaries between cells. For example, if $n = 5$ and $m = 9$, the $2 \cdot 5 \cdot 9 - 5 - 9 = 76$ matchsticks are placed in the following way:



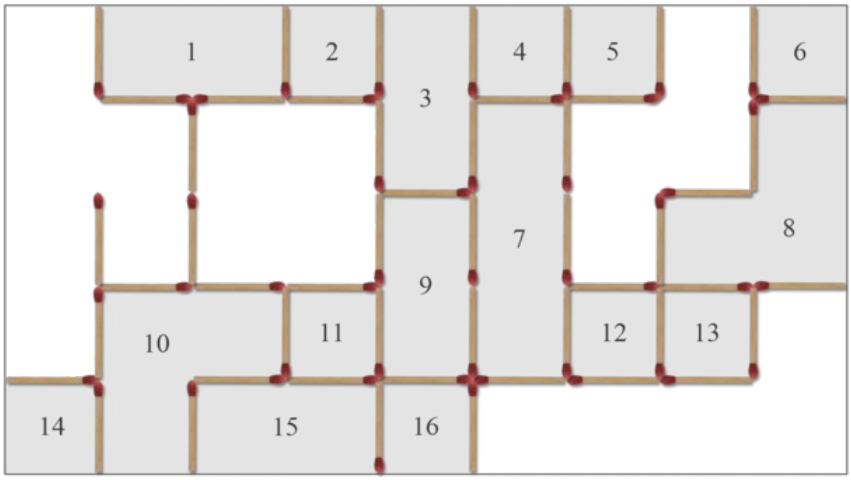
The Experiment

1. For each of the $2 \cdot n \cdot m - n - m$ matchsticks, remove it with probability p.
2. We define a *connected component* to be a maximal set of cells not isolated from one another by matchsticks. We calculate our $score$ as the number of connected components in the grid with ≤ 3 cells, divided by $n \cdot m$.

For example, suppose our grid looks like this after performing the first step:



To calculate our $score$, we need to first find the number of connected components having ≤ 3 cells. The diagram below counts all such components consisting of ≤ 3 connected cells:



As you can see, there are 16 connected components of size ≤ 3. From this, we perform the following calculation:

$$score = \frac{(\text{connected components with size } \leq 3)}{n \cdot m} = \frac{16}{45} \approx 0.35555555$$

You are given q queries where each query consists of n, m, and p. For each query, find and print the *expected* value of $score$ on a new line.

Need Help? Check out this learning aid explaining some important properties of *expected values*.

Input Format

The first line contains an integer, q, denoting the number of queries.
Each of the q subsequent lines contains three space-separated integers describing the respective values of integer n, integer m, and real number p.

Constraints

- $0 \leq p \leq 1$
- $1 \leq q, n, m \leq 10^5$
- p is a real number scaled to two decimal places (e.g., 1.23).

Subtask

- For 40% of the total score, $q, n, m \leq 300$

Output Format

For each query, print a single real number on a new line denoting the answer to the query. Any answer having an absolute error within 10^{-9} of the true answer is acceptable.

Sample Input 0

```
2
2 2 0.50
2 3 0.75
```

Sample Output 0

```
0.4375000000
0.0810546875000
```

Explanation 0

We can verify our answer by performing several brute-force simulations of the experiment and then averaging the scores.