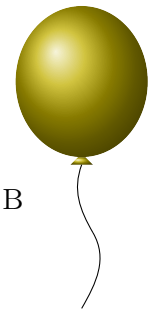
B Uniform Chemistry



Time limit: 2.0s
Memory limit: 2048MB

In a parallel universe there are n chemical elements, numbered from 1 to n. The element number n has not been discovered so far, and its discovery would be a pinnacle of research and would bring the person who does it eternal fame and the so-called SWERC prize.

There are m independent researchers, numbered from 1 to m, that are trying to discover it. Currently, the i-th researcher has a sample of the element s_i. Every year, each researcher independently does one *fusion experiment*. In a fusion experiment, if the researcher currently has a sample of element a, they produce a sample of an element b that is chosen uniformly at random between $a+1$ and n, and they lose the sample of element a. The elements discovered by different researchers or in different years are completely independent.

The first researcher to discover element n will get the SWERC prize. If several researchers discover the element in the same year, they all get the prize. For each $i = 1, 2, \ldots, m$, you need to compute the probability that the i-th researcher wins the prize.

Input

The first line contains two integers n and m ($2 \le n \le 100$, $1 \le m \le 10$) — the number of elements and the number of researchers.

The second line contains m integers $s_1, s_2, \ldots, s_m$ ($1 \le s_i < n$) — the elements that the researchers currently have.

Output

Print m floating-point numbers. The i-th number should be the probability that the i-th researcher wins the SWERC prize. Your answer is accepted if each number differs from the correct number by at most 10^{-8}.

Samples

Sample input 1	Sample output 1
2 3 1 1 1	1.0 1.0 1.0

Explanation of sample 1.
All researchers will discover element 2 in the first year and win the SWERC prize.

Sample input 2	Sample output 2
3 3 1 1 2	0.5 0.5 1.0

Explanation of sample 2.
The last researcher will definitely discover element 3 in the first year and win the SWERC prize. The first two researchers have a 50% chance of discovering element 2 and a 50% chance of discovering element 3, and only element 3 will bring them the prize.

Sample input 3	Sample output 3
3 3 1 1 1	0.625 0.625 0.625

Explanation of sample 3.
Each researcher has an independent 50% chance of discovering element 3 in the first year, in which case they definitely win the SWERC prize. Additionally, if they all discover element 2 in the first year, which is a 12.5% chance, then they will all discover element 3 in the second year and all win the prize.

Sample input 4	Sample output 4
100 7 1 2 4 8 16 32 64	0.178593469 0.179810455 0.182306771 0.187565366 0.199300430 0.229356322 0.348722518