Problem C. Optimal Time

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	256 megabytes

Define the set $S(x)$ as:

$$S(x) = \{d \mid d \mid x\} \cup \left\{kx \mid 2 \le k \le \left\lfloor \frac{N}{x} \right\rfloor\right\}$$

In simple terms, $S(x)$ is the union of all divisors of x and all multiples of x that do not exceed N.

Assume your current state is x. Every second, you have two choices:

- Randomly change to a number in $S(x)$ with equal probability.
- Do nothing.

At the end of each second, $x \leftarrow x - 1$.

You are required to find the expected time to reach the state 0 under optimal decision-making.

Little A wants to know the expected time to reach 0 for different values of x under optimal decision-making, so he has Q queries. Please help him answer these questions.

Input

The first line contains two positive integers N, Q ($1 \le N, Q \le 10^5$), representing the size of the value range and the number of queries.

The next Q lines each contain a positive integer x ($1 \le x \le N$), representing a single query.

Output

For each query, you need to output a real number.

If the absolute or relative error compared to the correct answer does not exceed 10^{-6}, it will be considered a correct answer.

Examples

standard input	standard output
3 2 3 2	1.7500000000 1.5000000000
1000 2 114 514	4.7506538205 3.7750763456