High Jump

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

Henry is participating in a high jump competition. Before each jump he can choose the height of the bar as an integer from 1 to n. As his long-time coach you know Henry's abilities well. For each possible height h you know the probability p_h of successfully clearing the bar at that height. Naturally, the greater the height, the lower the probability of success.

In today's competition there is no room for mistakes. One failed jump ends the competitor's performance, with his result being the highest previously cleared height (or 0 if he failed the first jump). The performance automatically ends with a score of n if height n is cleared. Help Henry choose the optimal heights for each jump. What is the maximum possible expected value* of his score?

Input

The first line contains an integer n ($1 \leq n \leq 500\,000$) denoting the limit on the bar height.

The second line contains n real numbers $p_1, p_2, \ldots, p_n$ ($0 < p_i < 1$; $p_i > p_{i+1}$), each with at most 9 digits after the decimal point. The number p_i is the probability of successfully clearing the bar at height i.

Output

Output a single real number – the maximum possible expected value of Henry's score.

Your answer should have an absolute or relative error of at most 10^{-6}. That means that if you output x, and the correct exact result is y, then your answer will be judged as correct if $|x - y| \leq 10^{-6} \cdot \max(1, y)$. You may output up to 20 digits after the decimal point.

Example

standard input	standard output
5 0.9 0.85 0.6 0.456000 0.000000017	2.475200006589

Note

The following strategy is optimal:

- Set the bar at height 2. Henry clears it with probability 0.85 or ends with a score of 0 (probability 0.15).
- If he clears the first jump, set the bar at height 4. Henry clears it with probability 0.456 or ends with a score of 2.
- If he clears the second jump, set the bar at height 5. Henry either clears it with probability 0.000000017 and ends with a score of 5, or fails, ending with a score of 4.

The expected value of this strategy is:

$$0 \cdot 0.15 + 2 \cdot 0.85 \cdot 0.544 + 4 \cdot 0.85 \cdot 0.456 \cdot 0.999999983 + 5 \cdot 0.85 \cdot 0.456 \cdot 0.000000017 = 2.4752000065892$$

* *The expected value* is the probability-weighted average value of a random variable. Intuitively, it is the average outcome of a random experiment if it was repeated many times.