

Problem D: Movie

Your friend Max is *the* up-and-coming star in the *YouTube* scene. At least that's what he keeps telling you and everybody who wants (or doesn't want) to listen. Last month he discovered the video *The entire bee movie but every time they say bee it gets faster*, which gathered more than 16 million views on the site – and now he wants to create his own version of that video.



The original video: <https://youtu.be/E6iN6VTL7v8>

“Surely”, Max says, “if that guy can reach millions of views with such a simple video, then so can I.” He goes on to explain that the video starts at normal speed, but whenever the word “bee” is said, the playback speed gets multiplied by a fixed factor s . Of course, Max cannot just copy the original video, so he has opted to use a film about cats and to have speedups happen for every occurrence of the word “cat” instead. (“The internet totally loves cats”, he explains, “so that should get me a lot of clicks.”)

He has already marked all occurrences of “cat” in several movies in his video editing software. To help him decide which movie to choose he has asked you to calculate how long the final edited videos would be.

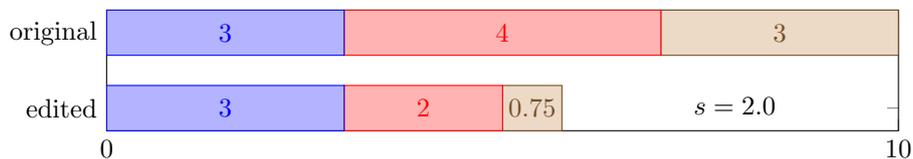


Figure D.1: Illustration of the first sample input. After 3 seconds the playback speed doubles; after 5 seconds the 7-second marker is reached and the speed doubles again.

Input

The input consists of:

- One line with three numbers:
 - an integer L ($1 \leq L \leq 100\,000$), the length of the movie in seconds;
 - a real number s ($1.1 \leq s \leq 3.0$), the speedup factor;
 - an integer n ($1 \leq n \leq 500$), the number of occurrences of the word “cat” in the movie.
- One line with n distinct integers t_1, \dots, t_n , where $0 < t_i < L$ is the time in seconds from the beginning of the movie to the i^{th} occurrence of the word “cat”. These times are given in increasing order.

Output

Output one line with one number, the final length of the edited video. Your output will be accepted if the absolute or relative error does not exceed 10^{-6} .

Sample Input 1

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10 2.0 2
3 7
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Sample Output 1

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5.75
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Sample Input 2

14 1.3 2
3 9

Sample Output 2

10.57396449704142

Sample Input 3

100 1.5 3
20 60 70

Sample Output 3

60.0