Problem F
Food Processor

Time Limit: 2 sec

You have a food processor with a variety of blades that can be attached to it, as well as some food you would like to process into smaller pieces.

The food processor can have one blade attached at any time. Each blade processes food by reducing its average piece size at a particular exponential rate, but it also has a maximum average piece size requirement; if the average piece size of the food is too big for the blade, the food processor will get stuck. Given a starting average food piece size, a target average piece size, and a set of blades for your food processor, determine the minimum amount of processing time needed to process your food into the target average piece size.

Note that we only care about the time spent actively processing food; we do not track time spent switching out blades or loading/unloading the food processor.

Input

The first line of input contains three integers s, t, and n ($1 \leq t < s \leq 10^6, 1 \leq n \leq 10^5$), where s is the starting average piece size, t is the target average piece size, and n is the number of blades.

Each of the next n lines contains two integers m and h ($1 \leq m, h \leq 10^6$). These are the blades, where m is the maximum average piece size of the blade and h is the number of seconds the blade needs to halve the average piece size.

Output

Output a single number, which is the minimum amount of time in seconds needed to process the food to the target average piece size. If it is not possible to reach the target, output -1. Your answer should have a *relative* error of at most 10^{-5}.

Sample Input 1	Sample Output 1
10 1 2 10 10 4 5	23.219281

Sample Input 2	Sample Output 2
10000 9999 1 10000 1	1.4427671804501932E-4