Doge Miner

Time Limit: 1 Second
Memory Limit: 2048 MB

Doge Miner is a famous browser game where the goal is to click the Doge on your screen as many times as you can (perhaps you've played similar games such as Cookie Clicker). Since you are playing on your laptop's trackpad, you can only click once per second. This means that every second you gain one coin.

The game also has n upgrades. Each upgrades costs c_i coins to buy, and afterwards, the time it takes for you to gain a coin is divided by p_i. You can only buy each upgrade once.

You know that it takes k coins to go to the Moon. Since you are very eager to reach the Moon, you want to know the minimum time it takes to get k coins.

Input

The first line contains integer n ($0 \leq n \leq 10^5$) and k ($0 \leq k \leq 10^9$), denoting the number of upgrades and the total number of coins you want to gain.

The next line contains n integers $c_1...c_n$ ($1 \leq c_i \leq 10^9$), where c_i denotes the cost of the i-th upgrade.

The next line contains n integers $p_1...p_n$ ($2 \leq p_i \leq 10^9$), where p_i denotes the production rate multiplier of the i-th upgrade.

Output

On the first line, output the minimum time it takes for you to get k coins. Your answer will be considered correct if it has at most 10^{-6} absolute or relative error.

Sample Inputs

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3 10
5 8 3
3 4 2
```

Sample Outputs

```
7.166667
3 1
```

Note

For the sample, you should buy upgrade 3 then upgrade 1.