Making Candies

Karl loves playing games on social networking sites. His current favorite is *CandyMaker*, where the goal is to make candies.

Karl just started level n, in which he must make n candies using m machines and w workers. In a single *pass*, he can make $m \times w$ candies; after each pass, he can decide whether to spend some of his candies to buy more machines or hire more workers. Buying a machine or hiring a worker costs p units of candies, and there is no limit to the number of machines he can build or workers he can hire.

Karl wants to maximize his score by making all n candies in a minimum number of passes. Can you find and print the minimum number of passes required for Karl to make at least n units of candies?

Input Format

A single line consisting of four space-separated integers describing the respective values of m (the number of machines), w (the number of workers), p (the price of buying one machine or hiring one worker), and n (the number of candies Karl must make).

Constraints

- $1 \leq m, w, p, n \leq 10^{12}$

Output Format

Print the minimum number of passes required to make at least n candies.

Sample Input

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3 1 2 12
```

Sample Output

```
3
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Explanation

Karl makes three passes:

1. In the first pass, he makes $m \times w = 3 \times 1 = 3$ candies. He then spends $p = 2$ of them hiring another worker, so $w = 2$ and he has one candy left over.
2. In the second pass, he makes $3 \times 2 = 6$ candies. He spends $2 \cdot p = 4$ of them on another machine and another worker, so $w = 3$ and $m = 4$ and he has 3 candies left over.
3. In the third pass, Karl makes $4 \times 3 = 12$ candies. Because this satisfies his goal of making at least $n = 12$ candies, we print the number of passes (i.e., 3) as our answer.