

4th BCPC programming league



You are given an integer N . You can perform the following two types of operations:

- Pay $X\$$ to replace N with $\lfloor N/A \rfloor$.
- Pay $Y\$$ to roll a dice that shows an integer between 1 and 6 , inclusive, with equal probability. Let b be the outcome of the dice, and replace N with $\lfloor N/b \rfloor$.

Determine the minimum expected cost paid before N becomes 0 when optimally choosing operations.

The outcome of the dice in each operation is independent of other rolls, and the choice of operation can be made after observing the results of the previous operations.

Constraints

- $1 \leq N \leq 1000000000000000000$
- $2 \leq A \leq 6$
- $1 \leq X, Y \leq 1000000000$
- All input values are integers.

Input

The input is given from Standard Input in the following format:

```
N A X Y
```

Output

Print the answer.

Your output will be considered correct if the absolute or relative error from the true answer is at most 10^{-6} .

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Sample 1:

Input	Output
3 2 10 20	20.0000000000000000

The optimal strategy is to perform the first operation twice.

Sample 2:

Input	Output
3 2 20 20	32.0000000000000000

The optimal strategy is as follows:

- First, perform the second operation to roll the die.
 - If the outcome is 4 or greater, then N becomes 0. (cost = 60)
 - If the outcome is 2 or 3, then N becomes 1. Now, perform the first operation to make $N=0$. (cost = 80)
 - If the outcome is 1, restart from the beginning. (cost = 20)
 - $(80 + 60 + 20) / 5 = 32$