NOI '16 P3 - The Beauty of Cycles

Time limit: 2.0s **Memory limit:** 512M

We say a base-k real number is *beautiful* if the decimal part of the real number is purely cyclic.

Now we want to know given base-10 numbers n, m, how many **distinct** (in value) purely cyclic real numbers there are that can be represented by $\frac{x}{y}$ where $1 \leq x \leq n$, $1 \leq y \leq m$, and x, y are integers.

A real number is said to be purely cyclic if and only if it can be written in the form of

$$a.\dot{c_1}c_2c_3\ldots c_{p-1}\dot{c_p}$$

where a is an (base-k) integer, $p \geq 1$, and for $1 \leq i \leq p$, c_i is a digit in base k.

For example, under base 10,

$$0.45454545\cdots = 0.\dot{4}\dot{5}$$

is purely cyclic and can be represented by $\frac{5}{11}$ or $\frac{10}{22}$. Under base 10,

$$0.166666\cdots = 0.1\dot{6}$$

is not purely cyclic but can be represented by fractions like $\frac{1}{6}$.

Attention: an integer is purely cyclic since its decimal part can be written as repeating 0s or repeating $k-1$s. A terminating decimal whose decimal part is non-zero is not considered to be purely cyclic.

Notes: In China, the repeating part of a repeating decimal is marked by one or two dots. In some countries, the repeating part is marked by a line above the repeating part.

Input Specification

The input consists of one line with three base-10 integers n, m, k whose meanings are described in the problem description.

Output Specification

Output a line with an integer denoting the beautiful numbers satisfying all the constraints.

Sample Input 1

```
2 6 10
```

Sample Output 1

```
4
```

Explanation of Sample 1

The beautiful numbers are $1/1 = 1.0000\ldots$, $1/3 = 0.3333\ldots$, $2/1 = 2.0000\ldots$, $2/3 = 0.6666\ldots$. Even though $1/1$ and $2/2$ are both purely cyclic, they are equal in value so they are only counted once. Similarly, $1/3$ and $2/6$ should also be counted once.

Sample Input 2

```
23333 666666 310
```

Sample Output 2

```
5089564081
```

Constraints

For all test cases, $1 \le n \le 10^9$, $1 \le m \le 10^9$, $2 \le k \le 2000$.

Items left blank means there are **no special restrictions**.

Test case	n	m	k
1	≤ 10	≤ 20	$= 2$
2	≤ 100	$\le 10^4$	
3	$\le 1\,000$		
4	$\le 10\,000$		
5	≤ 10	≤ 20	$= 3$
6	≤ 100	$\le 10^4$	
7	$\le 1\,000$		
8	$\le 10\,000$		

9	≤ 10	≤ 20	≤ 100
10	≤ 100	$\leq 10^4$	
11	$\leq 1\,000$		$\leq 1\,000$
12	$\leq 10\,000$		
13	$\leq 10^5$	$\leq 10^8$	≤ 100
14	$\leq 2 \times 10^5$		$\leq 1\,000$
15	$\leq 5 \times 10^5$		
16	$\leq 10^6$	$\leq 10^8$	≤ 100
17	$\leq 2 \times 10^6$		≤ 1000
18	$\leq 5 \times 10^6$		
19	$\leq 10^7$	$\leq 10^8$	≤ 100
20	$\leq 2 \times 10^7$		$\leq 1\,000$
21			
22,23	$\leq 10^8$	$\leq 10^8$	
24,25			