# Problem H. Subspace

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|---|---|
| Input file: | *standard input* |
| Output file: | *standard output* |
| Time limit: | 1 second |
| Memory limit: | 512 mebibytes |

bobo is a big fan of linear algebra! He plans to count the number of $k$-dimension subspaces in $\mathbb{F}_q^n$ modulo $p$.

For those who are not familiar with linear algebra:

- $\mathbb{F}_q$ is the set $\{0, 1, \ldots, q-1\}$, with addition and multiplication modulo $q$ defined on;
- $\mathbb{F}_q^n$ is the $n$-dimension vector space $\{(x_1, x_2, \ldots, x_n) : x_1, x_2, \ldots, x_n \in \mathbb{F}_q\}$;
- A subset $K \subseteq \mathbb{F}_q^n$ is a subspace, if and only if for all $\mathbf{p}, \mathbf{q} \in K$, $\mathbf{p} + \mathbf{q} \in K$;
- The dimension of subspace $K$ is the cardinality of the maximal independent subset;
- A subset $\{\mathbf{p}_1, \mathbf{p}_2, \ldots, \mathbf{p}_k\} \subseteq K$ is called independent if and only if equation $c_1 \cdot \mathbf{p}_1 + c_2 \cdot \mathbf{p}_2 + \cdots + c_k \cdot \mathbf{p}_k = 0$ has only solution $c_1 = c_2 = \cdots = c_k = 0$.

## Input

4 integers $q, n, k, p$ ($2 \le q \le 10^9, 1 \le k \le n \le 10^9, 2 \le p \le 2 \cdot 10^5$).

It is guaranteed that $p$ and $q$ are prime numbers.

## Output

A single integer denotes the number of subspaces.

## Examples

| standard input | standard output |
|---|---|
| 2 3 2 100003 | 7 |