Valuable Forests

Input file:	`standard input`
Output file:	`standard output`
Time limit:	6 seconds
Memory limit:	1024 megabytes

We define the value of an unrooted tree T as $\sum_{u \in V(T)} (d(u))^2$, where $V(T)$ is the set of all vertices of T, and $d(u)$ is the degree of the vertex u. We define the value of a forest as the sum of the value of all trees from it. Now we want you to answer the sum of the value of all forests with N labeled vertices.

In order to avoid calculations of huge integers, report answer modulo a prime M instead.

Input

There are multiple test cases. The first line of the input contains two integers T and M ($1 \leq T \leq 5000, 1 \leq M \leq 2^{30}$, and M is a prime), indicating the number of test cases and the modulus.

For each test case, the only line contains an only integer N ($1 \leq N \leq 5000$).

Output

For each test case, output the sum of answer modulo M in one line.

Example

standard input	standard output
5 1000000007 2 3 4 5 107	2 24 264 3240 736935633