Summing the K-N-R Series

HackerRank

You are given a sequence whose n^{th} term is

$$T_n = n^K \times R^n$$

You have to evaluate the series

$$S_n = T_1 + T_2 + T_3 + \cdots + T_n$$

Find $S_n \bmod (10^9 + 7)$.

Input Format

The first line of input contains T, the number of test cases.
Each test case consists of three lines, each containing K, n and R respectively.

Output Format

For each test case, print the required answer in a line.

Constraints

$1 \leq T \leq 10$
$1 \leq K \leq 10^3$
$1 \leq n \leq 10^{16}$
$2 \leq R \leq 10^{16}$
$R \bmod (10^9 + 7) \neq 1$

Sample Input

```
2
2
5
2
3
4
3
```

Sample Output

```
1146
5988
```

Explanation

Case 1: $1146 = 1^2 \times 2^1 + 2^2 \times 2^2 + 3^2 \times 2^3 + 4^2 \times 2^4 + 5^2 \times 2^5$
Case 2: $5988 = 1^3 \times 3^1 + 2^3 \times 3^2 + 3^3 \times 3^3 + 4^3 \times 3^4$