

# Summing the K-N series

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

$$T_n = n^K$$

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 one line containing two space-separated integers  $n$  and  $K$ .

## Output Format

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

## Constraints

$$\begin{aligned} 1 &\leq T \leq 10 \\ 0 &\leq K \leq 10^3 \\ 1 &\leq n \leq 10^{16} \end{aligned}$$

## Sample Input

```
3
5 3
4 2
4 1
```

## Sample Output

```
225
30
10
```

## Explanation

Case 1: We have  $225 = 1^3 + 2^3 + 3^3 + 4^3 + 5^3$   
Case 2: We have  $30 = 1^2 + 2^2 + 3^2 + 4^2$   
Case 3: We have  $10 = 1^1 + 2^1 + 3^1 + 4^1$