Problem 2 - Riceboard

In the SOLAR Laboratory, the Reply Social Lab, students and Replyers likes to play table games while they discuss problems and solutions. While playing chess, one of the Replyers comes up with a problem based on the legend about the origin of the game.

You are given a chessboard **N** cells wide and high (for a total of **N** × **N** cells). You are going to put **1** rice grain in the first cell, **R** rice grains in the second cell, **R** × **R** rice grains in the third cell and so on, so that each cell will contain **R** times the number of rice grains in the cell that was previously filled, until no cells of the chessboard are left empty.

After completing the chessboard you will start to fill bags with the rice grains on it. Each bag can carry at most **M** rice grains: after completely filling a bag, you will start filling a new one.

Once no rice grains are left, you are going to sell all the bags which are *completely* filled. If a bag doesn't contain exactly **M** rice grains it cannot be sold and its contents will be wasted.

Can you help the Replyer find how many rice grains will be wasted at minimum?

Input data

The first line of the input file contains an integer **T**, the number of test cases to solve, followed by **T** testcases, numbered from **1** to **T**.

In each test case the first and only line contains the three integers **R**, **N** and **M**.

Output data

The output file must contains **T** lines. For each test case in the input file, the output file must contain a line with the words:

Case #t: w

where *t* is the test case number (from **1** to **T**) and *w* is the number of wasted rice grains.

Constraints

- $1 \leq$ **T** ≤ 50.
- $1 \leq$ **R** ≤ 1000.
- $1 \leq$ **N** $\leq 1\,000\,000\,000$.
- $1 \leq$ **M** $\leq 1\,000\,000\,000$.

Scoring

- **input 1** : **T** = 1, **N** $\leq$ 3, **M** is a prime number and **R** = 2.

- **input 2** : **T** = 5, **N** $\leq$ 200, **M** is a prime number and **R** = 2.

- **input 3** : **T** = 10, **N** $\leq$ 10 000, **M** is a prime number and **R** = 2.

- **input 4** : **T** = 25, **N** $\leq$ 1 000 000, **M** is a prime number.

- **input 5** : **T** = 50, **N** $\leq$ 1 000 000 000.

Examples

input	output
3 3 2 13 2 3 100 2 3 73	Case #1: 1 Case #2: 11 Case #3: 0

Explanation

In the first test case we have a chessboard of 2 × 2 cells, containing respectively 1, 3, 9 and 27 rice grains for a total of 40.
They will fully fill 3 bags of size 13 and a last bag with only **1** rice grain.

1	3
9	27

First chessboard

In the second test case we have a chessboard of 3 × 3 cells, containing respectively 1, 2, 4, 8, 16, 32, 64, 128 and 256 rice grains for a total of 511.
They will fully fill 5 bags of size 100 and a last bag with **11** rice grains.

1	2	4
8	16	32
64	128	256

Second chessboard

In the last test case we have the same chessboard of the second test case but with a bag size of 73.
511 rice grains will fully fill exactly 7 bags so there will be no waste.

1	2	4
8	16	32
64	128	256

Third chessboard