

Contest Duration: 2025-10-25(Sat) 23:00 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20251025T2100&p1=248>) - 2025-10-26(Sun) 00:40 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20251025T2240&p1=248>) (local time) (100 minutes)

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G - Sum of Pow of Mod of Linear

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Time Limit: 4 sec / Memory Limit: 1024 MiB

Score : 625 points

Problem Statement

You are given integers N, M, A, B, X, R .

Find the remainder when $\sum_{k=0}^{N-1} X^{(Ak+B) \text{ mod } M}$ is divided by R .

You are given T test cases, so find the answer for each of them.

Constraints

- $1 \leq T \leq 100$
- $1 \leq N, M, R \leq 10^9$
- $0 \leq A, B < M$
- $1 \leq X < R$
- All input values are integers.

Input

The input is given from Standard Input in the following format:

2026-01-02 (Fri)
05:32:23 +11:00

```
T  
case1  
case2  
:  
caseT
```

Each test case case_i is given in the following format:

```
N M A B X R
```

Output

Print T lines.

On the i -th line, print the remainder when $\sum_{k=0}^{N-1} X^{(Ak+B)} \bmod M$ is divided by R for the i -th test case.

Sample Input 1

[Copy](#)

```
3  
4 5 2 1 2 1000000000  
777 429 33 58 1 1000000000  
20251025 429429 777 1025 575757 998244353
```

[Copy](#)

Sample Output 1

[Copy](#)

```
15  
777  
445271630
```

[Copy](#)

Consider the first test case.

- When $k = 0$: $X^{(Ak+B)} \bmod M = 2^{(2 \times 0 + 1) \bmod 5} = 2^1 = 2$.
- When $k = 1$: $X^{(Ak+B)} \bmod M = 2^{(2 \times 1 + 1) \bmod 5} = 2^3 = 8$.
- When $k = 2$: $X^{(Ak+B)} \bmod M = 2^{(2 \times 2 + 1) \bmod 5} = 2^0 = 1$.
- When $k = 3$: $X^{(Ak+B)} \bmod M = 2^{(2 \times 3 + 1) \bmod 5} = 2^2 = 4$.

From the above, the desired value is the remainder when $2 + 8 + 1 + 4$ is divided by 1000000000 , which is 15. Therefore, print 15 on the 1st line.

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