CODEFORCES
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R. Median of Array

time limit per test: 3 seconds❓
memory limit per test: 256 megabytes

Let us define:

- F[1] = 1
- F[i] = (a*M[i] + b*i + c) mod 10^9 + 7 for i > 1

where M[i] is the median of the array {F[1], F[2], ..., F[i-1]}.

The median of an array is the middle element of that array when it is sorted. If there are an even number of elements in the array, we choose the first of the middle two elements to be the median.

Given a, b, c and n, calculate the sum F[1] + F[2] + .. + F[n].

Input

The first line contains T ($1 \le T \le 100$) the number of test cases. Each of the next T lines contain 4 integers a, b, c ($0 \le a, b, c < 10^9 + 7$) and n ($1 \le n \le 200000$).

Output

Output T lines, one for each test case, containing the required sum.

Example

input	Copy
2 1 0 0 3 3 1 2 6	

output	Copy
3 103	

→ **About Time Scaling** ⌄

This contest uses time limits scaling policy (depending on a programming language). The system automatically adjusts time limits by the following multipliers for some languages. Despite scaling (adjustment), the time limit cannot be more than 30 seconds. Read the details by the link.

→ **Virtual participation** ⌄

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

[Start virtual contest]

→ **Submit?**

Language: [GNU G++20 13.2 (64 bit, win ▾]

Choose file: [Choose File] No file chosen

[Submit]

→ **Last submissions**

Submission	Time	Verdict
312249476	Mar/24/2025 23:46	Accepted
312224254	Mar/24/2025 19:51	Time limit exceeded on test 2