Aritho-geometric Series (AGS)

Arithmetic and geometric progressions are 2 of the well known progressions in maths.

Arithmetic progression (AP) is a set in which the difference between 2 consecutive numbers is constant. For example: 1, 3, 5, 7, 9... In this series the difference between 2 numbers is 2.

Geometric progression (GP) is a set in which the ratio of 2 consecutive numbers is the same. For example: 1, 2, 4, 8, 16... In this the ratio of the numbers is 2.

What if there is a series in which we multiply a(n) by 'r' to get a(n+1) and then add 'd' to a(n+1) to get a(n+2)?

For example: let's say d = 1 and r = 2 and a(1) = 1, the series would be 1, 2, 4, 5, 10, 11, 22, 23, 46, 47, 94, 95, 190...

We add d to a(1) and then multiply a(2) with r and so on.

Your task is, given 'a', 'd' and 'r' to find the a(n) term.

since the numbers can be very large, you are required to print the numbers modulo 'mod' - mod will be supplied in the test case.

Input

First line of input will have number 't' indicating the number of test cases.

Each of the test cases will have 2 lines. The first line will have 3 numbers 'a', 'd' and 'r'. The second line will have 2 numbers 'n' and 'mod'.

a = first term of the AGS.

d = the difference element.

r = the ratio element.

n = n^{th} term required to be found.

mod = need to print the result modulo mod

Output

For each test case print "a(n) % mod" in a separate line.

Example

Input:
2
1 1 2
13 7
2 2 2
10 8

Output:
1
6

Explanation

For the first test case the series is 1, 2, 4, 5, 10, 11, 22, 23, 46, 47, 94, 95, 190..., the 13^{th} term is 190, and 190 % 7 = 1.

Notes

The value of a, d, r, n and mod will be less than 10^8 and more than 0.

For every series, the second term will be a+d and third term will be (a+d)*r, and so on.