GCD mocktail

The Rebel Alliance and the Galactic Empire are engaged in an epic battle in the skies above Endor. The grand setup has d-dimensional board with each dimension of length 'N', (i.e) N x N... (d times). Each cell (i_1, i_2, ...i_d) has the gcd (i_1, i_2, ...i_d) written on it.

Now, the game begins. A random integer L is chosen and the first person to sum up the L^{th} power of each number modulo 30000001 wins the game.

Rebel Alliance needs some help and pings you. If they win, you get a million dollars for it. Can you help?

Input Format

There are several test cases. The first line contains the number of test cases T. Then T test cases follow.
Each test case is given in the following format.
N and d are given in the first Line.
Q is given in the second line.
Each of the next Q lines contain an integer L.

Constraints

0<=T<=10
1<=N<=10^7
1<=d<=1000
0<=L<=100
0<=Q<=50

Output Format

For each test case, output Q lines, indicating the answer.

Sample Input

```
3
3 2
4
0
1
2
3
5 1
3
0
1
2
6 3
2
2
3
```

Sample Output

```
9
12
20
42
5
15
55
421
```

975

Explanation

Test case1:
the board is as follows:

1(gcd 1,1) 1(gcd 1,2) 1(gcd 1,3)
1(gcd 2,1) 2(gcd 2,2) 1(gcd 2,3)
1(gcd 3,1) 1(gcd 3,2) 3(gcd 3,3)

Therefore, sum of 0th power is 1^0+1^0+1^0 + 1^0+2^0+1^0 + 1^0+1^0+3^0 = 9
sum of 1st power is 1^1+1^1+1^1 + 1^1+2^1+1^1 + 1^1+1^1+3^1 = 12
so on …

Test case2:
the board is as follows:

1(gcd 1) 2(gcd 2) 3(gcd 3) 4(gcd 4) 5(gcd 5)

Therefore,
sum of 0th power is 1^0+2^0+3^0+4^0+5^0 = 5
sum of 1st power is 1^1+2^1+3^1+4^1+5^1 = 15
so on …