Light Gremlins

Problem Statement

There are a group of gremlins that live in a long hallway in which there are a series of light switches. At the beginning of each night, all of the light switches are off. Then, one at a time, each gremlin does the following:

- The gremlin chooses a prime number *p*, that has not been chosen by any previous gremlin that night.
- The gremlin runs down the hallway flipping every p^{th} switch.

The owner of the hallway, who is very concerned about his electricity bill, has asked you to determine how many switches are on at the end of the night.

Note: no two gremlins will choose the same prime number.

Consider the following example where the hallway has 21 switches and there are three gremlins. At the beginning of the night, all switches are off, as shown in the figure below.

Switch:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
State:	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off

The first gremlin chooses the prime number 7, and flips the 7^{th}, 14^{th}, and 21^{st} switch. Now the configuration is:

Switch:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
State:	Off	Off	Off	Off	Off	Off	**On**	Off	Off	Off	Off	Off	Off	**On**	Off	Off	Off	Off	Off	Off	**On**

The second gremlin chooses the prime number 13, and flips just the 13^{th} switch, because there is no 26^{th} switch. Now the configuration is:

Switch:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
State:	Off	Off	Off	Off	Off	Off	**On**	Off	Off	Off	Off	Off	**On**	**On**	Off	Off	Off	Off	Off	Off	**On**

The last gremlin chooses the prime number 3. It flips the 3^{rd}, 6^{th}, 9^{th}, 12^{th}, 15^{th}, 18^{th}, and 21^{st} switch. Note that when he flips the 21^{st} switch, it is turned back off. The final configuration is:

Switch:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
State:	Off	Off	**On**	Off	Off	**On**	**On**	Off	**On**	Off	Off	**On**	**On**	**On**	**On**	Off	Off	**On**	Off	Off	Off

For this example, you would report that there are 9 lights on at the end of the night.

Input Format

The input begins with an integer *t*, 1 <= *t* <= 20, on a line by itself.

Then follow *t* lines, each describing a test case that you must evaluate. The test cases have the following format:

```
[switch] [n] [prime_1] [prime_2] ... [prime_n]
```

Where

- [switch] is the number of switches in the hallway, 1 <= [switch] <= 10^{18}

- [n] is the number of gremlins who live in the hallway, 1 <= [n] <= 24
- The prime number chosen by the i^{th} gremlin is given by [prime_i]. All primes are greater than or equal to 2 and less than 10^4.

Output Format

For each test case, you should output a single integer that indicates how many switches are on at the end of the night.

Sample Input

```
3
21 3 7 13 3
20 1 31
30 3 2 3 5
```

Sample Output

```
9
0
15
```

Explanation

The first test case corresponds to the example given in the Problem Definition, which as described above results in 9 "on" switches at the end of the night.

In the second test case, there is a single gremlin, who chooses the prime 31. The hallway consists of only 20 switches, so there is no 31^{st} switch. Thus, no switches are turned on.

The last test case consists of a hallway of length 30, and three gremlins. The action of the gremlins is as follows:

- The first gremlin flips switches {2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30}. All of these switches were previously off, so they are now on.
- The second gremlin flips switches {3, 6, 9, 12, 15, 18, 21, 24, 27, 30}. Of these, {6, 12, 18, 24, 30} were previously on, so they are now off. This results in the following switches being on: {2, 3, 4, 8, 9, 10, 14, 15, 16, 20, 21, 22, 26, 27, 28}.
- The third gremlin flips switches {5, 10, 15, 20, 25, 30}. Of these, {10, 15, 20} were previously on, so they are now off. This results in the following switches being on: {2, 3, 4, 5, 8, 9, 14, 16, 21, 22, 25, 26, 27, 28, 30}.

Thus, there are 15 switches on at the end of the night.