

# Strange Sequence

Given integers:  $r$  ( $1 < r < 100$ ) and  $s$  we define a sequence  $X(r,s)$  in such a way that  $X(r,s)_0 = s$  and  $X(r,s)_{i+1}$  is equal to  $X(r,s)_i$  plus the sum of digits of  $X(r,s)_i$  when expressed in the standard base- $r$  positional system.

Task: given  $r, s < M < 100000$  find out how many elements of  $X(r,s)$  are required to reach  $M$ , that is, find the smallest  $i$  such that  $X(r,s)_i$  is precisely equal to  $M$ .

## Input

In the first line you are given three decimal integers:  $r, M, n$ , where  $n < 100000$  is the number of test cases. In each of the following  $n$  lines you are given one decimal, nonnegative integer  $s$  specific for a given test case.

## Output

For each of the test cases output in the separate line the one requested number in decimal format or -1 if such a number does not exist.

### Example 1

**Input:**

2 10 3

7

3

8

**Output:**

1

3

-1

**Explanation:**

7(Dec) = 111(Bin)

The sum of digits of 111(Bin) is 3(Dec)

7+3=10 (Dec)

10 has been reached in one step.

3(Dec) = 11(Bin)

The successive elements are (Dec): 5, 7, 10 (3 steps)

8(Dec) = 1000(Bin)

The successive elements are (Dec): 9, 11, ...

10(Dec) will not be reached.

### Example 2

**Input:**

21 1234 3

3

8

1207

**Output:**

-1

-1

1

**Scoring**

By solving this problem you score 10 points.