CODE FORCES
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HOME   TOP   CONTESTS   GYM   PROBLEMSET   GROUPS   RATING   EDU   API   CALENDAR   HELP   ICPC CHALLENGE 🏆   10 YEARS! 🎁

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PROBLEMS   SUBMIT   STATUS   STANDINGS   CUSTOM TEST

D. Zero Remainder Array

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given an array a consisting of n positive integers.

Initially, you have an integer $x = 0$. During one move, you can do one of the following two operations:

1. Choose **exactly one** i from 1 to n and increase a_i by x ($a_i := a_i + x$), then increase x by 1 ($x := x + 1$).
2. Just increase x by 1 ($x := x + 1$).

The first operation can be applied **no more than once** to each i from 1 to n.

Your task is to find the minimum number of moves required to obtain such an array that each its element is **divisible by k** (the value k is given).

You have to answer t independent test cases.

Input

The first line of the input contains one integer t ($1 \le t \le 2 \cdot 10^4$) — the number of test cases. Then t test cases follow.

The first line of the test case contains two integers n and k ($1 \le n \le 2 \cdot 10^5; 1 \le k \le 10^9$) — the length of a and the required divisior. The second line of the test case contains n integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le 10^9$), where a_i is the i-th element of a.

It is guaranteed that the sum of n does not exceed $2 \cdot 10^5$ ($\sum n \le 2 \cdot 10^5$).

Output

For each test case, print the answer — the minimum number of moves required to obtain such an array that each its element is **divisible by k**.

Example

input

```
5
4 3
1 2 1 3
10 6
8 7 1 8 3 7 5 10 8 9
5 10
20 100 50 20 100500
10 25
24 24 24 24 24 24 24 24 24 24
8 8
1 2 3 4 5 6 7 8
```

output

```
6
18
0
227
8
```

Note

Consider the first test case of the example:

Codeforces Round #653 (Div. 3)
Finished

→ Virtual participation

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Start virtual contest

→ Problem tags

math   sortings   two pointers   *1400
No tag edit access

→ Contest materials

- Announcement   ✕
- Tutorial   ✕

1. $x = 0$, $a = [1, 2, 1, 3]$. Just increase x;
2. $x = 1$, $a = [1, 2, 1, 3]$. Add x to the second element and increase x;
3. $x = 2$, $a = [1, 3, 1, 3]$. Add x to the third element and increase x;
4. $x = 3$, $a = [1, 3, 3, 3]$. Add x to the fourth element and increase x;
5. $x = 4$, $a = [1, 3, 3, 6]$. Just increase x;
6. $x = 5$, $a = [1, 3, 3, 6]$. Add x to the first element and increase x;
7. $x = 6$, $a = [6, 3, 3, 6]$. We obtained the required array.

Note that you can't add x to the same element more than once.