Hard Cash

Problem Code: **CASH**

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All submissions for this problem are available.### Read problem statements in Hindi, Bengali, Mandarin Chinese, Russian, and Vietnamese as well.

Chef wants to take Chefina on a date. However, he has to complete one more task before leaving. Since he does not want to be late, he is asking you for help.

There are N bags with coins in a row (numbered 1 through N); for each valid i, the i-th bag contains A_i coins. Chef should make the number of coins in each bag divisible by a given integer K in the following way:

- choose an integer c between 0 and N (inclusive)
- take some coins from the first c bags — formally, for each i ($1 \le i \le c$), he may choose any number of coins between 0 and A_i inclusive and take them out of the i-th bag
- move some of these coins to some of the last $N - c$ bags — formally, for each i ($c + 1 \le i \le N$), he may place a non-negative number of coins in the i-th bag

Of course, the number of coins placed in the last $N - c$ bags must not exceed the number of coins taken out from the first c bags, but there may be some coins left over. Let's denote the number of these coins by R. You should find the smallest possible value of R.

Input

- The first line of the input contains a single integer T denoting the number of test cases. The description of T test cases follows.
- The first line of each test case contains two integers N and K.
- The second line contains N space-separated integers $A_1, A_2, \ldots, A_N$.

Output

For each test case, print a single line containing one integer — the smallest value of R.

Constraints

- $1 \le T \le 10^3$
- $1 \le N \le 10^5$
- $0 \le A_i \le 10^9$ for each valid i
- $1 \le K \le 10^9$
- the sum of N over all test cases does not exceed 10^5

Subtasks

Subtask #1 (10 points): $K = 2$

Subtask #2 (20 points): $N \le 3$

Subtask #3 (70 points): original constraints

Example Input

```
2
5 7
1 14 4 41 1
3 9
1 10 19
```

Example Output

```
5
3
```

Explanation

Example case 1: One of the possible solutions is to choose $c = 4$, remove $1, 0, 4$ and 13 coins from bags $1, 2, 3$ and 4 respectively, and add 13 coins to bag 5.

Example case 2: The optimal solution is to choose $c = 3$ and remove one coin from each bag.

Author:	sahi1422
Editorial:	https://discuss.codechef.com/problems/CASH
Tags:	cakewalk, feb20, greedy, math, sahi1422, tmwilliamlin
Date Added:	28-01-2020
Time Limit:	1 secs
Source Limit:	50000 Bytes
Languages:	C, CPP14, JAVA, PYTH, PYTH 3.6, PYPY, CS2, PAS fpc, PAS gpc, RUBY, PHP, GO, NODEJS, HASK, rust, SCALA, swift, D, PERL, FORT, WSPC, ADA, CAML, ICK, BF, ASM, CLPS, PRLG, ICON, SCM qobi, PIKE, ST, NICE, LUA, BASH, NEM, LISP sbcl, LISP clisp, SCM guile, JS, ERL, TCL, SQL, kotlin, PERL6, TEXT, SCM chicken, PYP3, CLOJ, R, COB, FS

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