



Chef and Mover

Problem Code: **CHEFMOVR**

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Chef's dog Snuffles has so many things to play with! This time around, Snuffles has an array **A** containing **N** integers: **A₁**, **A₂**, ..., **A_N**.

Bad news: Snuffles only loves to play with an array in which **all** the elements are equal.

Good news: We have a *mover* of size **D**!

A mover of size **D** is a tool which helps to change arrays. Chef can pick two existing elements **A_i** and **A_j** from the array, such that $i + D = j$ and subtract 1 from one of these elements, and add 1 to the other element. In effect, a single operation of the mover, moves a value of 1 from one of the elements to the other.

Chef wants to find the minimum number of times she needs to use the mover of size **D** to make all the elements of the array **A** equal. Help her find this out.

Input

- The first line of the input contains an 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 **D**, denoting the number of elements in the array and the size of the mover.
- The second line of each testcase contains **N** space-separated integers: **A₁**, **A₂**, ..., **A_N**, denoting the initial elements of the array.

Output

- For each test case, output a single line containing the minimum number of uses or -1 if it is impossible to do what Snuffles wants.

Constraints

- $1 \leq T \leq 10$
- $2 \leq N \leq 10^5$
- $1 \leq D < N$
- $1 \leq A_i \leq 10^9$

Subtasks

- Subtask 1** (30 points) : $N \leq 10^3$
- Subtask 2** (70 points) : Original constraints

Example

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Input :

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

Output :

```
5
2
-1
```

Explanation**Testcase 1:**

Here is a possible sequence of usages of the mover:

- Move 1 from A_3 to A_1
- Move 1 from A_3 to A_1
- Move 1 from A_2 to A_4
- Move 1 from A_2 to A_4
- Move 1 from A_2 to A_4

At the end, the array becomes (3, 3, 3, 3, 3), which Snuffles likes. And you cannot achieve this in fewer moves. Hence the answer is 5.

Testcase 2:

Here is a possible sequence of usages of the mover:

- Move 1 from A_2 to A_1
- Move 1 from A_2 to A_3

At the end, the array becomes (1, 1, 1), which Snuffles likes. And you cannot achieve this in fewer moves. Hence the answer is 2.

Testcase 3:

It is impossible to make all the elements equal. Hence the answer is -1.

Author: [berezin \(/users/berezin/\)](/users/berezin/)

Date Added: 14-06-2016

Time Limit: 1 secs

Source Limit: 50000 Bytes

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6★ [kr_abhinav \(/users/kr_abhinav\)](/users/kr_abhinav) 20 hours ago

Sample Test data is not consistent with constraints. It's given that $1 \leq A_i \leq 10^9$ but still elements in sample cases have value 0

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4★ [dpraveen \(/users/dpraveen\)](/users/dpraveen) 16 hours ago

@kr_abhinav (https://www.codechef.com/users/kr_abhinav): Thanks, we will correct this up.

[Reply](#) 

[maxim1000 \(/users/maxim1000\)](/users/maxim1000) a day ago

Is the array considered cyclic? If we have mover size=1 can we do the operation on the first and the last elements?

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4★ [dpraveen \(/users/dpraveen\)](/users/dpraveen) 21 hours ago

@maxim1000 (<https://www.codechef.com/users/maxim1000>): No, array elements can't be considered cyclic.

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