Problem E
Aggregating Points
Time Limit: 6 seconds

One fundamental problem in computing science is clustering points in a cheap way. This is usually used to group "similar" objects together. Here, you will deal with a simple version.

You are given n points P scattered throughout the number line. You suspect that these n points were obtained by multiple "noisy" observations of just k points. Thus, you want to find k points C on the line such that the maximum distance between some point of P and its nearest point on C is as small as possible. Actually, you only care about the minimum such distance and not the actual locations of the k points.

Input

The first line contains a single integer $T \leq 10$ indicating the number of test cases. The first line of each test case consists of two integers n and k satisfying $1 \leq k \leq n \leq 10^5$. The final line of each test case consists of n integers $x_1, \ldots, x_n$ satisfying $1 \leq x_1 \leq x_2 \leq \ldots \leq x_n \leq 10^9$. These numbers are the n points P mentioned above. Consecutive numbers on this line will be separated by a single space.

Output

For each test case, output a single floating point d number with exactly one decimal place. This number d should be the smallest number such that there is some set C of k numbers where every x_i in the input is at most distance d from some point in C.

Sample Input	Sample Output
3 3 2 1 2 3 3 3 1 2 3 6 2 1 5 5 10 20 30	0.5 0.0 5.0