Fat Fat Shik

Description

Shik likes the number a lot. He is a genius of math.

Now Shik wants to play a game with you. He generates a set of n numbers $a_1, a_2, \ldots, a_n$. Each time you pick a number from the set uniform randomly (with replacement). You repeat the picking procedure k times, and the score you can get is the difference between the maximum and the minimum number you picked. What is the expected value of score you can get?

Note that since you pick numbers with replacement, it is possible that you pick the same numbers in k times.

Input

The first line contains an integer T indicating the total number of test cases. Each test case begins with two integer corresponding to n, k in the statement. The second line of each test case contains n integers $a_1, a_2, \ldots, a_n$, denoting the set of numbers.

- $1 \leq T \leq 2500$
- $1 \leq n, k \leq 50$
- $1 \leq a_i \leq 5555$
- All a_i are distinct.

Output

For each test case, please output the result in a line.

Sample Input

```
2
1 1
514
5 2
1 2 3 5 8
```

Sample Output

```
0
2.72
```