Choosing Warriors

Description

As a brilliant commander, Cebrusfs is ready for war.

Cebrusfs has n warriors, and each one has his/her own strength a_i. Now Cebrusfs wants to choose exactly m warriors to enter the war. To make the army be easily leaded, he also wants to minimize the variance of that m warriors. Formally, he wants $\frac{1}{m}\sum(b_i - \bar{b})^2$ as small as possible, where b_i is the strength of chosen warriors, and $\bar{b}$ is the average strength of them.

Input

The first line contains a integer T indicating the total number of test cases. Each test case begins with two integer n, m, denoting the total number of warriors, and the number of warriors to be chosen. Following line contains n integers a_i, denoting the strength of i-th warrior.

- $T \leq 1000$
- $1 \leq n \leq 100000$
- $1 \leq m \leq n$
- $0 \leq b_i \leq 1000000$
- There will be less than 35 test cases with $n > 1000$.

Output

For each test case, print the minimum variance of the chosen m warriors.

Sample Input

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

Sample Output

```
0.250000000
0.666666667
```