

Problem D – Small Loss

Input file: `standard input`
Output file: `standard output`
Time limit: 3 seconds
Memory limit: 1024 megabytes

Kevin loves to gamble! Unfortunately, his favourite degenerate gambling game, Big Loss, has lived up to its name. Hoping for a change in fortune, he has agreed to play a new game with his friends Alice and Bob: Small Loss. Kevin is skeptical of the name, but his friends assure him that losing less money is practically the same as making money.

In Small Loss, each player brings a die. A die may have any positive number of faces, each labelled with an integer value. Different faces may have the same value. When a die is rolled, each face is equally likely to land face up, and the value on the side facing up is the result. All rolls are independent.

To play Small Loss, each player rolls their die once, and money changes hands according to the following rules:

- If all three results are distinct: Let the values be $a < b < c$. Then, the player who rolled a pays $2(b - a)$ dollars to the player who rolled b , **and** the player who rolled c pays $2(c - b)$ dollars to the player who rolled b .
- If exactly two results are equal: Let the repeated result be a and the remaining result be b . Then, the player who rolled b pays $|b - a|$ dollars to **each** of the other two players who rolled a .
- If all three results are equal: No money changes hands. Boring!

You would like to help Kevin recover his losses from playing Big Loss. Fortunately, you have secretly discovered the values on every face of Alice's and Bob's dice. With this information, you can design a custom die for Kevin that maximizes his expected profit from playing Small Loss with Alice and Bob. His custom die may have any positive number of faces, each labelled with any integer.

Determine Kevin's maximum expected profit in dollars from one round of Small Loss with the optimal custom die. His profit is the amount he receives minus the amount he pays.

Input

The first line contains a single integer T ($1 \leq T \leq 10^4$), the number of test cases.

The first line of each test case contains two integers N and M ($1 \leq N, M \leq 2 \times 10^5$), representing the number of faces on Alice's and Bob's dice, respectively.

The second line of each test case contains N integers $a_1, \dots, a_N$ ($1 \leq a_i \leq 10^9$), representing the values on the faces of Alice's die.

The third line of each test case contains M integers $b_1, \dots, b_M$ ($1 \leq b_i \leq 10^9$), representing the values on the faces of Bob's die.

It is guaranteed that, over all test cases, the sum of N does not exceed 2×10^5 and the sum of M does not exceed 2×10^5 .

Output

For each test case, print a single real number: Kevin's maximum expected profit in dollars from one round of Small Loss with the optimal custom die. The answer will be considered as correct if it has an absolute or relative error of at most 10^{-6} .

Example

standard input	standard output
3	4.000000000000
1 1	1.777777777778
5	666666660.33333373070
7	
6 6	
1 2 3 4 5 6	
1 2 3 4 5 6	
3 2	
1000000000 1 1	
6 7	

Note

Intermediate results could exceed $2^{63} - 1$. In C++, you may use `__int128_t` for such calculations.