Exchange Error

Input file:	`standard input`
Output file:	`standard output`
Time limit:	4 seconds
Memory limit:	1024 megabytes

Mr. Nežmah has started his new gig as a quantitative researcher. He is working with historical data of an unnamed stock on an interval of n consecutive days. This data is represented as an array a_i, which indicates that the price of the stock **moved** by a_i on the i-th day. Just as he was going to start training his model, he noticed there was an error in the data!

The whole array a_i was shifted by an unknown constant. One of the key features in his model is the largest price change which happened in those n days. More formally, for an array b of length n, he is interested in

$$\max_{1 \le l \le r \le n} b_l + \ldots + b_r$$

Now, because the data is erroneous, Nežmah wants to calculate this value for different shifts of the array a, or formally

$$S(x) := \max_{1 \le l \le r \le n} (a_l + x) + \ldots + (a_r + x)$$

Help Nežmah calculate $S(x)$ for q different values of x!

Input

The first line contains a single integer t ($1 \le t \le 2 \cdot 10^4$), the number of test cases.

The first line of each test case contains two integers n and $q (1 \le n, q \le 2 \cdot 10^5)$.

The second line of each test case contains the array $a (-10^8 \le a_i \le 10^8)$.

The third line of each test case contains the q queries $(-10^8 \le x \le 10^8)$.

It's guaranteed that the sum of n and the sum of q over all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, output q numbers: the answers to the queries.

Example

standard input	standard output
2 5 7 1 2 6 9 -4 0 -1 -20 -2 5 -4 -8 7 8 6 -14 1 5 -14 3 -8 -5 -3 0 4 5 6 8 9	18 14 -11 11 39 7 1 1 3 6 14 18 23 35 42