PAPER

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

On the way to school today, Naot accidentally found a piece of paper on the road containing two integer arrays a and b of length n. On the back of the paper, there was a puzzle written as follows:

Let the i-th integer ($0 \le i < n$) of array a and array b be a_i and b_i, respectively. Define the function f as follows:

```
float f(float x, int a[], int b[], int n) {
    float res = 0;
    for(int i = 0; i < n; i++) {
        for(int j = 0; j < n; j++) {
            if(i != j) {
                int da = a[i] - a[j];
                int db = b[i] - b[j];
                res = max(res, da * cos(x) + db * sin(x));
            }
        }
    }
    return res;
}
```

Find the minimum value of the function f with two given arrays of numbers. The result should be accepted with an error tolerance of 10^{-6}.

Input

The first line contains a positive integer n ($2 \le n \le 10^6$).

The next line contains n integers $a_0, a_1, \ldots, a_{n-1}$ ($|a_i| \le 10^5$).

The following line contains n integers $b_0, b_1, \ldots, b_{n-1}$ ($|b_i| \le 10^5$).

Output

Minimum value of the function f.

Examples

standard input	standard output
5 3 2 9 3 2 5 5 5 5 5	0.0000000000
4 1 0 1 2 0 -1 -2 -1	1.4142135624
5 3 1 5 3 4 7 2 9 3 5	1.6712580436

Note

In the first example, the value of x that minimizes the function f is $x = \pi/2$.

In the second example, the value of x that minimizes the function f is $x = \pi/4$.