## 题目：

Given an array of integers `A` and let *n* to be its length.

Assume $B_k$ to be an array obtained by rotating the array `A` *k* positions clock-wise, we define a "rotation function" `F` on `A` as follow:

$F(k) = 0 * B_k[0] + 1 * B_k[1] + ... + (n-1) * B_k[n-1]$.

Calculate the maximum value of `F(0), F(1), ..., F(n-1)`.

**Note:**

*n* is guaranteed to be less than $10^5$.

**Example:**

```
A = [4, 3, 2, 6]


F(0) = (0 * 4) + (1 * 3) + (2 * 2) + (3 * 6) = 0 + 3 + 4 + 18 = 25

F(1) = (0 * 6) + (1 * 4) + (2 * 3) + (3 * 2) = 0 + 4 + 6 + 6 = 16

F(2) = (0 * 2) + (1 * 6) + (2 * 4) + (3 * 3) = 0 + 6 + 8 + 9 = 23

F(3) = (0 * 3) + (1 * 2) + (2 * 6) + (3 * 4) = 0 + 2 + 12 + 12 = 26


So the maximum value of F(0), F(1), F(2), F(3) is F(3) = 26.
```

1.时间：O（N^2）;空间：O（1）

```
class Solution {
public:
    int maxRotateFunction(vector<int>& A) {
        if (A.empty()) return 0;
```

```
        int result = std::numeric_limits<int>::min();
        const int size = A.size();
        for (int i = 0; i < size; ++i){
            int sum = 0;
            for (int k = 0; k < size; ++k){
                int index = (i + k) % size;
                sum += k * A[index];
            }
            result = std::max(result, sum);
        }
        return result;
    }
};
```

2.时间：O（N）；空间：O（1）

```
/*
```

找规律，先把具体的数字抽象为 A,B,C,D，那么我们可以得到：

F(0) = 0A + 1B + 2C +3D

F(1) = 0D + 1A + 2B +3C

F(2) = 0C + 1D + 2A +3B

F(3) = 0B + 1C + 2D +3A

那么，我们通过仔细观察，我们可以得出下面的规律：

F(1) = F(0) + sum - 4D

```
F(2) = F(1) + sum - 4C
F(3) = F(2) + sum - 4B
那么我们就找到规律了, F(i) = F(i-1) + sum - n*A[n-i]
*/
class Solution {
public:
    int maxRotateFunction(vector<int>& A) {
        if (A.empty()) return 0;
        int total = 0, sum = 0;
        const int size = A.size();
        for (int i = 0; i < size; ++i){
            sum += A[i];
            total += i * A[i];
        }
        int result = total;
        for (int i = 1; i < size; ++i){
            total = total + sum - size * A[size - i];
            result = std::max(result, total);
        }
        return result;
    }
};
```