

# 13096 Standard Deviation

In mathematics, the standard deviation of a set of  $n$  integer numbers is defined as:

$$S = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n - 1}}$$

where  $\bar{x}$  is the average of the set of  $n$  integer numbers for which the standard deviation is being calculated. That average is calculated as:

$$\bar{x} = \frac{1}{n} \cdot \sum_{i=1}^n x_i$$

The task is to calculate, **in an efficient way**, the standard deviation of the first  $n$  odd positive integer numbers.

### Input

There are several test cases in the input. Each test case consists of a single line containing a positive integer number  $n$  ( $2 \leq n \leq 10^6$ ) which indicates the amount of consecutive odd numbers (starting from one) that should be considered when calculating the standard deviation. The last test case has a value of '0', for which you shouldn't generate any response.

### Output

For each test case, you should print a single line containing a floating point number: the standard deviation of the first  $n$  odd positive numbers. The absolute error of your answer should not be greater than  $10^{-6}$ .

### Sample Input

```
10
100
1000
10000
100000
1000000
0
```

### Sample Output

```
6.055301
58.022984
577.638872
5773.791360
57735.315593
577350.557865
```