

11666 Logarithms

From time immemorial different series has been an integrated part of mathematics. Series is very important for finding values of many important functions such as $\sin(x)$, e^x , $\ln(x)$, etc. The well known formula for finding the value of $\ln(1 - x)$ is shown below:

$$\ln(1 - x) = -x - \frac{x^2}{2} - \frac{x^3}{3} - \frac{x^4}{4} - \dots \text{ to } \infty. \text{ Here } |x| < 1$$

However as this formula is true when x is less than 1, a modification is needed to find the formula for any integer. For any integer n the following relationship is true:

$$\ln(n) = L - x - \frac{x^2}{2} - \frac{x^3}{3} - \frac{x^4}{4} - \dots \text{ to } \infty.$$

Here $|x| < 1$ and it is a real number, n is a positive integer and L is a non-negative integer.

But for a given integer n , L can have more than one value. Your job is to find the smallest possible value of L and for that L find the value of x .



Input

The input file contains around 10000 line of input. Each line contains a single integer n ($0 < n < 2^{31} - 1$). Input is terminated by a line containing a zero.

Output

For each line of input produce one line of output. This line contains one integer followed by one floating point number. The integer number denotes the smallest possible value of L and floating-point number denotes the corresponding value of x . This floating-point number should have eight digits after the decimal point.

Sample Input

```
6
7
300
0
```

Sample Output

```
2 0.18798830
2 0.05265302
6 0.25637435
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