Compute the n-th digit, in the hexadecimal expansion of the following expression.

$$\left(\int_0^1 36 \left(\prod_{k=1}^{\infty} \frac{2}{\sqrt[2^k]{2}+1} \right)^2 - 48(x+1)^{-1} \sum_{k=0}^{\infty} \frac{(-1)^k}{k+1} x^{2k+2} dx \right)^{1/2}$$

In other words, if the expression is equal to $n_1.n_2n_3 \ldots n_k \ldots$ in hexadecimal. Given k, output n_k. Each digit is an element of {1,2,3,4,5,6,7,8,9,A,B,C,D,E,F}. For example, the hexadecimal expansion of 1/11 is 0.0F0F0F0F0F...

Input

The input will consist of at most 50 lines with the value of k ($k < 1000001$) on each line.

Output

For each line of input, output the hexadecimal digit on a single line.

Sample Input

```
100
200
```

Sample Output

```
A
4
```