Problem 8: Big Number

(Medium-Hard)

(Adapted from UVa 01185)

In many applications very large integers numbers are required. Some of these applications are using keys for secure transmission of data, encryption, etc. In this problem you are given a number, you have to determine the **number of digits** in the **factorial of the number**.

Input Format

Input consists of several lines of integer numbers. The first line contains an integer n, which is the number of cases to be tested, followed by n lines, one integer on each line.

Constraints

- $1 \leq n \leq 1000$
- The integer on each line is more than or equal to 1 and less than or equal to 10^5.

Output Format

The output contains the number of digits in the factorial of the integers appearing in the input.

Sample Input

```
2
10
20
```

Sample Output

```
7
19
```

Explanation

The input contains $n = 2$ integers.

- Since $10! = 3\ 628\ 800$, it has 7 digits.
- Since $20! = 2\ 432\ 902\ 008\ 176\ 640\ 000$, it has 19 digits.