

SPOJ Problem Set (classical)

5161. Factorial vs Power

Problem code: FACVSPOW

Consider two integer sequences $f(n) = n!$ and $g(n) = a^n$, where n is a positive integer. For any integer $a > 1$ the second sequence is greater than the first for a finite number of values. But starting from some integer k , $f(n)$ is greater than $g(n)$ for all $n \geq k$. You are to find the least positive value of n for which $f(n) > g(n)$, for a given positive integer $a > 1$.

Input

The first line of the input contains number t - the amount of tests. Then t test descriptions follow. Each test consist of a single number a .

Constraints

$1 \leq t \leq 100000$
 $2 \leq a \leq 10^6$

Output

For each test print the least positive value of n for which $f(n) > g(n)$.

Example

Input :

3
2
3
4

Output :

4
7
9

Added by: Spooky

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Time limit: 2s

Source limit:50000B

Languages: All

Resource: Advancement Autumn 2009, <http://sevolymp.uuuq.com/>