Smallest Inverse Sum of Divisors

First, we define $\sigma(\mathbf{i}) = \text{Sum of all positive divisors of } \mathbf{i}$.

For example: all positive divisors of $60 = \{1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60\}$

So
$$\sigma(60) = 1 + 2 + 3 + 4 + 5 + 6 + 10 + 12 + 15 + 20 + 30 + 60 = 168$$

Now for the task: given an integer **n** find smallest integer **i** such that $\sigma(\mathbf{i}) = \mathbf{n}$.

Input

The first line is an integer **T** ($1 \le T \le 100,000$), denoting the number of test cases. Then, T test cases follow.

For each test case, there is an integer \mathbf{n} (1 \leq \mathbf{n} \leq 100,000,000) written in one line. (One integer per line.)

Output

For each test case, output the smallest inverse sum of divisors of \mathbf{n} . if \mathbf{n} doesn't have inverse, output -1.

Example

Input:

5

ı

16

40

60

168

Output:

। -1

27

24

60

<u>Time Limit</u> ≈ 2.5*(My Program Top Speed)

See also: Another problem added by Tjandra Satria Gunawan