Project Euler #229: Four Representations using Squares

This problem is a programming version of Problem 229 from projecteuler.net

Consider the number 3600. It is very special, because

$$3600 = 48^2 + 36^2$$

$$3600 = 20^2 + 2 \times 40^2$$

$$3600 = 30^2 + 3 \times 30^2$$

$$3600 = 45^2 + 7 \times 15^2$$

Similarly, we find that $88201 = 99^2 + 280^2 = 287^2 + 2 \times 54^2 = 283^2 + 3 \times 52^2 = 197^2 + 7 \times 84^2$

In 1747, Euler proved which numbers are representable as a sum of two squares. We are interested in the numbers n which admit representations of all of the following types:

$$n = a_1^2 + b_1^2$$

$$n = a_2^2 + 2 \times b_2^2$$

$$n = a_3^2 + 3 \times b_3^2$$

$$n = a_7^2 + 7 \times b_7^2$$

where the a_k and b_k are positive integers.

There are 75373 such numbers that do not exceed 10^7.

How many such numbers are there that do not exceed N?

Input Format

First line of each test file contains a single integer q which is the number of queries per test file. q lines follow, each containing a single integer N.

Constraints

- $1 \leq q \leq 1000$
- $200 \leq N \leq 10^{10}$
- Sum of all N per test file $\leq 10^{10}$

Output Format

For each query print exactly one number that is the answer to the problem on the separate line.

Sample Input 0

```
2
200
10000000
```

Sample Output 0

```
1
75373
```

Explanation 0

The smallest very special number is 193.