A conjecture of Paul Erdős (hard)

In number theory there is a very deep unsolved conjecture of the Hungarian Paul Erdős (1913-1996), that there exist infinitely many primes of the form x^2+1, where x is an integer. However, a weaker form of this conjecture has been proved: there are infinitely many primes of the form x^2+y^4. You don't need to prove this, it is only your task to find the number of (positive) primes not larger than n which are of the form x^2+y^4 (where x and y are integers).

Input

An integer T, denoting the number of testcases ($T \leq 500000$). Each of the T following lines contains a positive integer n, where $n \leq 10^{12}$.

Output

Output the answer for each n.

Example

Input:
6
1
2
10
9999999
500000000000
1000000000000

Output:
0
1
2
13175
25874902
42377120

ps. my running time on Cube is 9.83 seconds. There is one input set.

For a much easier version of this problem see http://www.spoj.com/problems/HS08PAUL.