Problem F. Heron and His Triangle

A triangle is a Heron's triangle if it satisfies that the side lengths of it are consecutive integers $t-1, t, t+1$ and that its area is an integer. Now, for given n you need to find a Heron's triangle associated with the smallest t bigger than or equal to n.

Input

The input contains multiple test cases. The first line of a multiple input is an integer T ($1 \leq T \leq 30000$) followed by T lines. Each line contains an integer N ($1 \leq N \leq 10^{30}$).

Output

For each test case, output the smallest t in a line. If the Heron's triangle required does not exist, output -1.

Sample

4 1 2 3 4	4 4 4 4

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