Problem L. Twice Equation

For given L, find the smallest n no smaller than L for which there exists an positive integer m for which $2m(m+1) = n(n+1)$.

Input

This problem contains multiple test cases. The first line of a multiple input is an integer T ($1 \leq T < 1000$) followed by T input lines. Each line contains an integer L ($1 \leq L < 10^{190}$).

Output

For each given L, output the smallest n. If available n does not exist, output -1.

Sample

3 1 4 21	3 20 119