Quadratic Conundrum

ZPRAC-16-17-Lab12

QUADRATIC CONUNDRUM [40 Points]
You have a quadratic function $f(x)=ax^2+bx+c$. Given such a function and an integer k, find the smallest non-negative integer x, such that f(x) ≥ k.

Input:
The first line contains a number t denoting the number of f(x), k pairs for which you have to solve the problem.
Then the t lines follow. Each line has 4 integers: a b c k

Output:
t lines which each line containing the desired answer

Constraints:
1 ≤ t ≤ 10^5
1 ≤ a,b,c ≤ 10^5
1 1 ≤ k ≤ 10^12

Example:
Input:
1
3 4 5 150

Output:
7

Explanation:
f(7) = 180 is greater than 150 whereas f(6) is not.

Hint / Caution:
1) Numbers such as 10^12 are large and cannot be stored in int variable, hence use long long instead of int, and when using scanf and printf for long long, use %lld, instead of %d. Then you can use long long like integers, think of them as integers with larger capacity (upto 10^18).

2) Binary search. Solution without binary search will yield no credit.