class Solution:

def numSquares(self, n: int) -> int:

def CheckTwo(c):

while c%2==0: c//= 2

while c%5==0: c//= 5

while c%9==0: c//= 9

if c%3==0: return False

if c in (0,1,13,17): return True

i, j = 0, isqrt(c)

while i <= j:

if i\*i + j\*j == c: return True

if i\*i + j\*j < c: i += 1

if i\*i + j\*j > c: j -= 1

return False

if n == isqrt(n)\*\*2:return 1 # case k = 1

if CheckTwo(n): return 2 # case k = 2

while n%4 ==0: n//=4 # case k = 3

if n%8 != 7: return 3

return 4 # case k = 4