Project Euler #233: Lattice points on a circle

This problem is a programming version of Problem 233 from projecteuler.net

Let $f(n)$ be the number of points with integer coordinates that are on a circle passing through $(0,0)$, $(n,0)$, $(0,n)$ and (n,n).

It can be shown that $f(10000) = 36$.

Given two integers N and m, what is the number of all positive integers $n \leq N$ such that $f(n) = 4m$?

Input Format

The first line of each test file contains a single integer q which is the number of queries.
Each of the next q lines contains two space-separated integers N and m.

Constraints

- $1 \leq m \leq 200$.
- m is an odd squarefree integer.
- In testfiles 3 to 29:
  - $1 \leq q \leq 20$.
  - $1 \leq N \leq 10^9$.
- In testfile 30 and above:
  - $q = 1$.
  - $1 \leq N \leq 5 \times 10^{10}$ when $m = 3$.
  - $1 \leq N \leq 10^{11}$ when $m \neq 3$.

Output Format

Print the answer to each query on a new line.

Sample Input 0

```
1
1000 1
```

Sample Output 0

```
433
```

Sample Input 1

```
1
100000000000 87
```

Sample Output 1

```
1
```

Explanation 1

The only integer n less than 10^{11} such that $f(n) = 348$ is 79345703125.

Sample Input 2

```
1
100000000000 31
```

Sample Output 2

```
3
```

Explanation 2

There exist only three integers $n \leq 10^{11}$ such that $f(n) = 124$: 30517578125, 61035156250 and 91552734375.