Complex numbers are not only complex, but also complicated. So you would better try to solve another problem...

We have a complex number, $a + b * i$, where i is the square root of -1. We want to make it simple (I mean, real), by raising it to a natural power. For example, complex number $2 + 2 * i$, can be made simple by raising it to 4:

$$(2 + 2 * i)^4 = -64$$

You have to compute the smallest natural number, N, (zero is not included) such that $(a + b * i)^N$ is a real number. Besides, we require that the absolute value of $(a + b * i)^N$ is not bigger than 2^{30}.

Input

The first line of the input contains an integer M, indicating the number of test cases.

For each test case, there is a line with two integers a and b. a is the real part of the complex number, and b is the imaginary part.

You can assume that $-10000 \leq a \leq 10000$, and $-10000 \leq b \leq 10000$.

Output

For each test case, the output should consist of a single positive natural number N in one line, indicating the power such that $(a + b * i)^N$ is real and its absolute value is not greater than 2^{30}. If there is no solution, you have to output '`TOO COMPLICATED`'.

Sample Input

```
5
817 0
2 2
0 -1
18 92
-7 7
```

Sample Output

```
1
4
2
TOO COMPLICATED
4
```