The keys on a calculator is bad broken. Only the 5 keys **sin**, **cos**, **tan**, **asin**, **atan** are still functional. Respectively, they stand for *sine*, *cosine*, *tangent*, *arc-sine*, and *arc-tangent*. Initially the calculator's display shows '0'.

Compute the minimum number of key presses, such that the decimal equivalent of the fraction $p/q$ will appear on the calculator! Please assume that the calculator has infinite precision, and that it uses radians for trig functions.

## Input

A number of test cases ($\leq 40000$), one per line, each with $p$ and $q$ ($0 \leq p \leq 1000$ and $1 \leq q \leq 1000$).

## Output

Output the answer for each test case, one on each line.

## Sample Input

```
0 1
1 1
1 2
```

## Sample Output

```
0
1
7
```