

## 2526 Multiply

“ $6 \times 9 = 42$ ” is not true for base 10, but is true for base 13. That is,  $6_{(13)} \times 9_{(13)} = 42_{(13)}$  because  $42_{(13)} = 4 \times 13^1 + 2 \times 13^0 = 54_{(10)}$ .

You are to write a program which inputs three integers  $p$ ,  $q$ , and  $r$  and determines the base  $B$  ( $2 \leq B \leq 16$ ) for which  $p \times q = r$ . If there are many candidates for  $B$ , output the smallest one. For example, let  $p = 11$ ,  $q = 11$ , and  $r = 121$ . Then we have  $11_{(3)} \times 11_{(3)} = 121_{(3)}$  because  $11_{(3)} = 1 \times 3^1 + 1 \times 3^0 = 4_{(10)}$  and  $121_{(3)} = 1 \times 3^2 + 2 \times 3^1 + 1 \times 3^0 = 16_{(10)}$ . For another base such as 10, we also have  $11_{(10)} \times 11_{(10)} = 121_{(10)}$ . In this case, your program should output 3 which is the smallest base. If there is no candidate for  $B$ , output 0.

### Input

The input consists of  $T$  test cases. The number of test cases ( $T$ ) is given in the first line of the input file. Each test case consists of three integers  $p$ ,  $q$ , and  $r$  in a line. All digits of  $p$ ,  $q$ , and  $r$  are numeric digits and  $1 \leq p, q, r \leq 1,000,000$ .

### Output

Print exactly one line for each test case. The line should contain one integer which is the smallest base for which  $p \times q = r$ . If there is no such base, your program should output ‘0’.

### Sample Input

```
3
6 9 42
11 11 121
2 2 2
```

### Sample Output

```
13
3
0
```