Problem E: Perfect Pth Powers

We say that x is a perfect square if, for some integer b, x = b^2. Similarly, x is a perfect cube if, for some integer b, x = b^3. More generally, x is a perfect pth power if, for some integer b, x = b^p. Given an integer x you are to determine the largest p such that x is a perfect pth power.

Each test case is given by a line of input containing x. The value of x will have magnitude at least 2 and be within the range of a (32-bit) int in C, C++, and Java. A line containing 0 follows the last test case.

For each test case, output a line giving the largest integer p such that x is a perfect pth power.

Sample Input

```
17
1073741824
25
0
```

Output for Sample Input

```
1
30
2
```

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