CODEFORCES
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HOME   TOP   CONTESTS   GYM   **PROBLEMSET**   GROUPS   RATING   EDU   API   CALENDAR   HELP

PROBLEMS   SUBMIT   STATUS   STANDINGS   CUSTOM TEST

B. Multiply by 2, divide by 6

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given an integer n. In one move, you can either multiply n by two or divide n by 6 (if it is divisible by 6 without the remainder).

Your task is to find the minimum number of moves needed to obtain 1 from n or determine if it's impossible to do that.

You have to answer t independent test cases.

Input

The first line of the input contains one integer t ($1 \le t \le 2 \cdot 10^4$) — the number of test cases. Then t test cases follow.

The only line of the test case contains one integer n ($1 \le n \le 10^9$).

Output

For each test case, print the answer — the minimum number of moves needed to obtain 1 from n if it's possible to do that or `-1` if it's impossible to obtain 1 from n.

Example

input	Copy

```
7
1
2
3
12
12345
15116544
387420489
```

output	Copy

```
0
-1
2
-1
-1
12
36
```

Note

Consider the sixth test case of the example. The answer can be obtained by the following sequence of moves from the given integer 15116544:

1. Divide by 6 and get 2519424;
2. divide by 6 and get 419904;
3. divide by 6 and get 69984;
4. divide by 6 and get 11664;
5. multiply by 2 and get 23328;
6. divide by 6 and get 3888;
7. divide by 6 and get 648;
8. divide by 6 and get 108;
9. multiply by 2 and get 216;

10. divide by 6 and get 36;
11. divide by 6 and get 6;
12. divide by 6 and get 1.