

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 ($1 \leq t \leq 2 \cdot 10^4$) — the number of test cases. Then t test cases follow.

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

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;

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Finished

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

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