

## 11762 Race to 1

Dilu have learned a new thing about integers, which is - any positive integer greater than 1 can be divided by at least one prime number less than or equal to that number. So, he is now playing with this property. He selects a number  $N$ . And he calls this  $D$ .

In each turn he randomly chooses a prime number less than or equal to  $D$ . If  $D$  is divisible by the prime number then he divides  $D$  by the prime number to obtain new  $D$ . Otherwise he keeps the old  $D$ . He repeats this procedure until  $D$  becomes 1. What is the expected number of moves required for  $N$  to become 1.

[We say that an integer is said to be prime if its divisible by exactly two different integers. So, 1 is not a prime, by definition. List of first few primes are 2, 3, 5, 7, 11, ...]

### Input

Input will start with an integer  $T$  ( $T \leq 1000$ ), which indicates the number of test cases. Each of the next  $T$  lines will contain one integer  $N$  ( $1 \leq N \leq 1000000$ ).

### Output

For each test case output a single line giving the case number followed by the expected number of turn required. Errors up to  $1e-6$  will be accepted.

### Sample Input

```
3
1
3
13
```

### Sample Output

```
Case 1: 0.0000000000
Case 2: 2.0000000000
Case 3: 6.0000000000
```