

Divisor Summation (Hard)

Given a natural number n ($1 \leq n \leq 1e16$), please output the summation of all its proper divisors.

Definition: A proper divisor of a natural number is the divisor that is strictly less than the number.

e.g. number 20 has 5 proper divisors: 1, 2, 4, 5, 10, and the divisor summation is: $1 + 2 + 4 + 5 + 10 = 22$.

Input

An integer stating the number of test cases (equal to 500), and that many lines follow, each containing one integer between 1 and $1e16$ inclusive.

Output

One integer each line: the divisor summation of the integer given respectively.

Example

Input:

3
2
10
20

Output:

1
8
22

warning: a naive algorithm may not run in time.