Project Euler #183: Maximum product of parts

This problem is a programming version of Problem 183 from projecteuler.net

Let N be a positive integer and let N be split into k equal parts, $r = n/k$, so that $N = r + r + \cdots + r$.

Let P be the product of these parts, $P = r \times r \times \ldots \times r = r^k$.

For example, if 11 is split into five equal parts, $11 = 2.2 + 2.2 + 2.2 + 2.2 + 2.2$, then $P = 2.2^5 = 51.53632$.

Let $M(N) = P_{max}$ for a given value of N.

It turns out that the maximum for $N = 11$ is found by splitting eleven into four equal parts which leads to $P_{max} = (11/4)$; that is, $M(11) = 14641/256 = 57.19140625$, which is a terminating decimal.

However, for $N = 8$ the maximum is achieved by splitting it into three equal parts, so $M(8) = 512/27$, which is a non-terminating decimal.

Let $D(N) = N$ if $M(N)$ is a non-terminating decimal and $D(N) = -N$ if $M(N)$ is a terminating decimal.

For example, $\sum D(N)$ for $5 \leq N \leq 100$ is 2438.

Find $\sum D(N)$ for $5 \leq N \leq n$.

Input Format

The first line of each test file contains q which is the number of test cases. q lines follow, each containing the number n for a given test case.

Constraints

- $1 \leq q \leq 10^5$
- $5 \leq n \leq 10^6$

Output Format

Print exactly q lines with a single integer on each line i.e. the answer to the corresponding test.

Sample Input 0

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1
100
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Sample Output 0

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2438
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