

Arup's Pseudoprimes

Filename: primesum

The Problem

Arup likes prime numbers, so naturally, many of his assignments involve prime numbers. Over the years however, he has realized that some students don't understand exactly what a prime number is. Some students, possibly due to their laziness, test a number for primality by dividing it by 2, 3, 5 and 7. If a number isn't divisible by these four numbers, the student gives up and assumes that the number is prime. This system erroneously labels 121, for example, as being prime. We define these numbers, along with all *real* prime numbers (that have no other divisor other than 1 and itself), as "Arup pseudoprimes."

In addition to prime numbers, Arup is fascinated with various sums. One of the sums he is interested in deals with these pseudoprimes. In particular, he is curious about the sum of the reciprocal of his pseudoprimes. The first few reciprocals of Arup pseudoprimes are:

$$\frac{1}{2}, \frac{1}{3}, \frac{1}{5}, \frac{1}{7}$$

The first term on this list that isn't the reciprocal of a prime number is $\frac{1}{121}$. From that point on, many other reciprocals on non-primes eventually appear. Arup would like your help in writing a program that can calculate the sum of any number of terms of this sequence, up to a million terms.

The Input

The first line of the input file will contain a single integer, n ($1 \leq n \leq 10000$), representing of sums you will have to calculate. The next n lines will each contain one integer k , ($1 \leq k \leq 1000000$), representing the number of terms in the summation you to calculate.

The Output

For each sum, output a single line with the following format:

Sum of k terms is approximately X.

where k is the number of terms being summed and X is the sum. Your answer will be deemed correct if it's within 10^{-8} of the actual sum.

Sample Input

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2
3
100
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Sample Output

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Sum of 3 terms is approximately 1.033333333333332.
Sum of 100 terms is approximately 2.1411967145251136.
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