Fibonacci Terms

The fibonacci sequence is a sequence of integers in which each number is equal to the sum of the two preceding numbers. The first two integers in the sequence are both 1. Formally:

- $F_1 = 1$
- $F_2 = 1$
- $F_i = F_{i-1} + F_{i-2}$ for each i > 2

The beginning of this sequence is 1,1,2,3,5,8,13,21.

We'll define the fibonacci position of an integer greater than or equal to 1 as follows:

- The fibonacci position of 1 is 2 (since $F_2 = 1$)
- The fibonacci position of any integer n > 1 such that $F_i = n$ is i
- The fibonacci position of any integer n > 1 such that it is strictly between F_i and F_{i+1} is i+ $(n-F_i)/(F_{i+1}-F_i)$ (informally, this means it is linearly distributed between F_i and F_{i+1})

As examples, if FP(n) is the fibonacci position of n,

FP(1)=2 (first rule)

FP(5)=5 (second rule $F_5 = 5$)

FP(4)=4.5 (third rule, is right in the middle of $F_4 = 3$ and $F_5 = 5$)

Given an integer **n**, find its fibonacci position as a double.

Input

First line contains **T <= 10.** Following each line contains an integer **1 <= n <= 10^8**.

Output

For each testcase, print the fibonacci position of **n,** rounded to 6 places of decimal.

Example

Input:

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4
1
5
4
100
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Output:

2.000000
5.000000
4.500000
11.200000