FAVDICE - Favorite Dice

no tags

BuggyD loves to carry his favorite die around. Perhaps you wonder why it's his favorite? Well, his die is magical and can be transformed into an N-sided unbiased die with the push of a button. Now BuggyD wants to learn more about his die, so he raises a question:

What is the expected number of throws of his die while it has **N** sides so that each number is rolled at least once?

Input

The first line of the input contains an integer **t**, the number of test cases. **t** test cases follow.

Each test case consists of a single line containing a single integer **N** (1 <= **N** <= 1000) - the number of sides on BuggyD's die.

Output

For each test case, print one line containing the expected number of times BuggyD needs to throw his **N**-sided die so that each number appears at least once. The expected number must be accurate to 2 decimal digits.

Example

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Input:
2
1
12

Output:
1.00
37.24
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