1248 – Dice (III)

Given a dice with **n** sides, you have to find the expected number of times you have to throw that dice to see all its faces at least once. Assume that the dice is fair, that means when you throw the dice, the probability of occurring any face is equal.

For example, for a fair two sided coin, the result is 3. Because when you first throw the coin, you will definitely see a new face. If you throw the coin again, the chance of getting the opposite side is 0.5, and the chance of getting the same side is 0.5. So, the result is

$$1 + (1 + 0.5 * (1 + 0.5 * ...))$$

$$= 2 + 0.5 + 0.5^2 + 0.5^3 + ...$$

$$= 2 + 1 = 3$$

Input

Input starts with an integer **T (≤ 100)**, denoting the number of test cases.

Each case starts with a line containing an integer **n (1 ≤ n ≤ 10^5)**.

Output

For each case, print the case number and the expected number of times you have to throw the dice to see all its faces at least once. Errors less than **10^-6** will be ignored.

Sample Input	Output for Sample Input
5 1 2 3 6 100	Case 1: 1 Case 2: 3 Case 3: 5.5 Case 4: 14.7 Case 5: 518.7377517640