Problem F. PSO

Time limit: 1 seconds
Memory limit: 64 Megabytes

Particle swarm optimization (PSO) is a population-based stochastic optimization algorithm. In addition to the basic structure of PSO, there is also a variant called star-topology PSO, which introduces a star-shaped communication structure among particles. In this structure, there is a central particle called the leader, which is responsible for gathering and disseminating information to the rest of the particles in the swarm.

Now there are n particles on the star-topology. Among the n particles, there is one particle as the leader, and there is an edge between the other particles and the leader. For a piece of information, it can be propagated along an edge on the topology.

To examine the benefits of this topology, we need to calculate the following data:

We define that X is number of edges required for them to exchange information for two different particles. Please calculate the expected value rounded off and maximum value of X.

Input

The first line of input is a positive integer $T(T \leq 10^5)$ representing the number of test cases. For each line,input a number $n(2 \leq n \leq 10^9)$.

Output

For each case, output two floating-point numbers representing the he expected value and maximum value of X. (keep 9 decimal places)

Example

standard input	standard output
2	1.500000000 2.000000000
4	1.714285714 2.000000000
7	