1284 – Lights inside 3D Grid

You are given a 3D grid, which has dimensions **X**, **Y** and **Z**. Each of the **X x Y x Z** cells contains a light. Initially all lights are off. You will have **K** turns. In each of the **K** turns,

1. You select a cell **A** randomly from the grid,
2. You select a cell **B** randomly from the grid and
3. Toggle the states of all the bulbs bounded by cell **A** and cell **B**, i.e. make all the ON lights OFF and make all the OFF lights ON which are bounded by **A** and **B**. To be clear, consider cell **A** is (x_1, y_1, z_1) and cell **B** is (x_2, y_2, z_2). Then you have to toggle all the bulbs in grid cell (x, y, z) where $\min(x_1, x_2) \le x \le \max(x_1, x_2)$, $\min(y_1, y_2) \le y \le \max(y_1, y_2)$ and $\min(z_1, z_2) \le z \le \max(z_1, z_2)$.

Your task is to find the expected number of lights to be ON after **K** turns.

Input

Input starts with an integer **T (≤ 50)**, denoting the number of test cases.

Each case starts with a line containing four integers **X, Y, Z (1 ≤ X, Y, Z ≤ 100)** and **K (0 ≤ K ≤ 10000)**.

Output

For each case, print the case number and the expected number of lights that are ON after **K** turns. Errors less than 10^{-6} will be ignored.

Sample Input	Output for Sample Input
5 1 2 3 5 1 1 1 1 1 2 3 0 2 3 4 1 2 3 4 2	Case 1: 2.9998713992 Case 2: 1 Case 3: 0 Case 4: 6.375 Case 5: 9.09765625