1395 – A Dangerous Maze (II)

You are in a maze; seeing **n** doors in front of you in beginning. You can choose any door you like. The probability for choosing a door is equal for all doors.

If you choose the $\mathbf{i}^{th}$ door, it can either take you back to the same position where you begun in $\mathbf{x_i}$ minutes, or can take you out of the maze after $\mathbf{x_i}$ minutes. If you come back to the same position, you can remember last **K** doors you have chosen. And when you are about to choose a door, you never choose a door that is already visited by you. Or we can say that you never choose a door that is visited as one of the last **K** doors. And the probability of choosing any remaining door is equal.

Now you want to find the expected time to get out of the maze.

Input

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

Each case contains a blank line and two integers **n K (1 ≤ n ≤ 100, 0 ≤ K ≤ n)**. The next line contains **n** space separated integers. If the $\mathbf{i}^{th}$ integer $\mathbf{(x_i)}$ is positive, you can assume that the $\mathbf{i}^{th}$ door will take you out of maze after $\mathbf{x_i}$ minutes. If it's negative, then the $\mathbf{i}^{th}$ door will take you back to the beginning position after $\mathbf{abs(x_i)}$ minutes. You can safely assume that $\mathbf{1 \le abs(x_i) \le 10000}$.

Output

For each case, print the case number and the expected time to get out of the maze. If it's impossible to get out of the maze, print **'-1'**. Otherwise print the result. Error less than $\mathbf{10^{-6}}$ will be ignored.

Sample Input	Output for Sample Input
4 2 0 10 10 2 0 10 -10 3 1 10 -10 -20 3 2 10 -10 -20	Case 1: 10 Case 2: 20.000 Case 3: 30.0000000000 Case 4: 25.0000000000