1274 – Beating the Dataset

You are in a contest, and unfortunately you don't have much time. You have one problem in hand; you just glanced at the sample output and found that it just wants 'YES' or 'NO'. So, you have made another plan instead of solving the problem as you know the system very well.

For this problem, every test case is stored in a separate file. When a submission is found, the system successively runs the solution on all tests of a problem, and for each test the checking process goes as follows. The input is copied to the file input.txt. Then the solution is launched. It reads the input from the file input.txt and writes the result to the file output.txt. When it finishes, the correct answer is copied to the file answer.txt. If the contents of the files answer.txt and output.txt match, the test is assumed to be passed; otherwise, the test is not passed.

So, you decided to write a program that would operate as follows. If the folder containing the program doesn't contain the file answer.txt (i.e. the program is run on the first test), then the program outputs "YES". Otherwise, the program outputs the contents of the file answer.txt. And before the contest, the sizes of the data files are given to you.

And it's clear that the size of the file with the answer "YES" is 3 bytes, the size of the file with the answer "NO" is 2 bytes, and all the variants of the order of tests are equally probable. Now you want to calculate the average number of tests that your solution won't pass.

Input

Input starts with an integer **T (≤ 10)**, denoting the number of test cases.

Each case starts with a line containing two integers **n (1 ≤ n ≤ 5000)** and **s (2n ≤ s ≤ 3n)** where **n** denotes the number of data sets and **s** denotes the total size of the answer files.

Output

For each case, print the case number and the average number of tests your solution won't pass. Error less than 10^{-6} will be ignored.

Sample Input	Output for Sample Input
4 3 7 1 2 1 3 4 10	Case 1: 2 Case 2: 1 Case 3: 0 Case 4: 2.5000000000

Note

For the first case, one of the three answers is "YES" and two answers are "NO". If the order of tests is "YES-NO-NO", then your solution won't pass the second test only; if the order is "NO-YES-NO", then it will pass none of the tests; if the order is "NO-NO-YES", the solution won't pass the first and the third tests.