

7736 Pocky

Let's talking about something of eating a pocky. Here is a Decorer Pocky, with colorful decorative stripes in the coating, of length L .

While the length of remaining pocky is longer than d , we perform the following procedure. We break the pocky at any point on it in an equal possibility and this will divide the remaining pocky into two parts. Take the left part and eat it. When it is not longer than d , we do not repeat this procedure.

Now we want to know the expected number of times we should repeat the procedure above. Round it to 6 decimal places behind the decimal point.

Input

The first line of input contains an integer N which is the number of test cases. Each of the N lines contains two float-numbers L and d respectively with at most 5 decimal places behind the decimal point where $1 \leq d, L \leq 150$.

Output

For each test case, output the expected number of times rounded to 6 decimal places behind the decimal point in a line.

Sample Input

```
6
1.0 1.0
2.0 1.0
4.0 1.0
8.0 1.0
16.0 1.0
7.00 3.00
```

Sample Output

```
0.000000
1.693147
2.386294
3.079442
3.772589
1.847298
```