Day 4: Binomial Distribution I

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10 Days of Statistics

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Objective

In this challenge, we learn about binomial distributions. Check out the Tutorial tab for learning materials!

Task

The ratio of boys to girls for babies born in Russia is $1.09 : 1$. If there is 1 child born per birth, what proportion of Russian families with exactly 6 children will have at least 3 boys?

Write a program to compute the answer using the above parameters. Then print your result, rounded to a scale of 3 decimal places (i.e., 1.234 format).

Input Format

A single line containing the following values:

```
1.09 1
```

If you do not wish to read this information from stdin, you can hard-code it into your program.

Output Format

Print a single line denoting the answer, rounded to a scale of 3 decimal places (i.e., 1.234 format).

Python 3

```
# Enter your code here. Read input from STDIN. Print output to STDOUT

def fact(n):
    return 1 if n == 0 else n*fact(n-1)

def comb(n, x):
    return fact(n) / (fact(x) * fact(n-x))

def b(x, n, p):
    return comb(n, x) * p**x * (1-p)**(n-x)

rate_b, rate_g = list(map(float, input().split(" ")))

odds = rate_b / rate_g
print(round(sum([b(i, 6, odds / (1 + odds)) for i in range(3, 7)]), 3))
```

Line: 14 Col: 22