Long Enough Texts and Diffie Helman: Untimed Midterm CMSC 456 Sample Inputs/Outputs and Testing Instructions

1. Long Enough Texts (Problem 1)

   Sample Input (given through stdin):

   ```
   thequickbrownfox15%@(%&)
   jumpsoverlazydogs
   ```

   Sample Output (read through stdout):

   ```
   0.04396393939393941
   0.05270882352941176
   0.047230909090909094
   0.04563888888888889
   0.058345714285714285
   0.06395833333333334
   0.049044
   0.047540000000000006
   0.04967
   0.07241249999999999
   0.04318666666666667
   0.08119
   0.07165666666666667
   0.05877666666666667
   0.05836666666666667
   0.05589
   0.060145000000000004
   0.070175
   0.062545
   0.08221500000000001
   0.082915
   0.054605
   0.11592000000000001
   0.07965
   0.07393
   0.094255
   ```

```
0.052735000000000004
0.05686
0.07001
0.082915
0.05834
0.08221500000000001
0.10322
```

In the autograder, outputs will be rounded to 4 decimal points. Do not round your values on your own. Notice how the number of *letters* in our input is 33, and we have 33 floats on 33 lines in our output. Since this example is with a very small text, we can't draw great conclusions about how much bigger $|T|$ needs to be than x.

2. Diffie Helman (Problem 3, despite being listed second in this list)

   Sample Input (L, given as command line argument):

   ```
   20
   ```

   Sample Output:

   ```
   1377359
   7
   313917
   605312
   436904
   1011223
   74594
   74594
   ```

   From this, we have our safe prime $p = 1377359$, our generator $g = 7$, $a = 313917$, $g^a = 605312$, $b = 436904$, $g^b = 1011223$, $(g^b)^a = g^{ab} = 74594$, and $(g^a)^b = g^{ab} = 74594$.

   Your output will almost definitely not look the same - if it does, you should buy a lottery ticket. The autograder only makes sure your program does the math correctly based on the safe prime, generator, a, and b you have chosen.