**Homework 1**

ENG 342, Fall 2016

Due: Tuesday, September 20, at the beginning of class.

This assignment has two parts, each of which should be submitted in hardcopy form:

1. *Problems from the book* (70 points total, broken down by section):

* Section 12.1 (15 pts): 2, 5, 11, 16
* Section 12.2 (20 pts): 3, 6, 15
* Section 12.3 (20 pts): 12, 22, 34, 35, 40
* Section 12.4 (15 pts): 1, 7

Each problem should detail the steps necessary to arrive at the solution. Please keep in mind that your final answers should always be simplified as much as possible.

Extra points may be given for problem sets typesetted in LaTeX (<https://www.latex-project.org)>. Microsoft Word will not count; please either handwrite or use LaTeX.

1. *Gibbs Sampling Computer Simulation* (30 points total, broken down by component): We discussed Gibbs Sampling in the lectures covering Sections 12.2/3 of the book.

Take one of the problems (3, 6, or 15) from Section 12.2 of the book and use MATLAB to do the following:

* + Plot the original function over the interval (8 pts).
  + On the same graph, plot the partial sums of the Fourier series for N = 1, N = 2, N = 10, and N = 100 (12 pts).
  + Label the axes and include a legend on the plot to identify each curve (5 pts).
  + Explain in a few sentences where the Gibbs phenomenon can be seen on the plot (5 pts).

For the first three bullets, your submission must include both the MATLAB code to generate the plot and the plot itself. Your code should be able to run as-is (if the printed version were to be typed into a computer) and generate the printed plot exactly.

Extra points may be given for MATLAB code that is vectorized, i.e., doing computations through vector/matrix manipulation rather than for/while loops.