# Statistics 5444: Homework 0

For each homework assignment, turn in at the beginning of class on the indicated due date. Late assignments will only be accepted with special permission. Write each problem up *very* neatly (LATEX is preferred). Show all of your work.

## Problem 1

Read When Did Bayesian Inference Become "Bayesian"? (See webpage).

#### Part a

Who originally coined the term Bayesian?

#### Part b

Who was the founder of Bayesian statistics? Justify why you think so.

### Problem 2

Consider observing data X. Assume you have a parametric model (i.e. sampling function, density/mass function, probability model, etc) which depends on the parameter  $\theta$ . The likelihood function (Recall that  $p(X|\theta) \propto L(\theta|X)$ ) is defined over the values of  $\theta \in \{-3, -2, -1, 0, 1, 2, 3, 4\}$ . Likelihood and prior distribution values are given in Table 1.

$\theta$	-3	-2	-1	0	1	2	3	4
$L(\theta X)$ :	0.5	2	1	3	1	3	2	0.5
$p(\theta)$ :	0.1	0.3	0.05	0.15	0.05	0.1	0.2	0.05

Table 1: Likelihood and prior values

#### Part a

Compute the posterior distribution over the valid range of  $\theta$  and plot the likelihood, prior and posterior in a single graph.

#### Part b

Compute  $E[\theta|X]$ .