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 θ. 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.

θ	-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 θ and plot the likelihood, prior and posterior in a single graph.

Part b

Compute $E[\theta|X]$.