Lesson 11

Quiz, 5 questions

1 point

1.

Suppose we flip a coin five times to estimate θ, the probability of obtaining heads. We use a Bernoulli likelihood for the data and a non-informative (and improper) Beta(0,0) prior for θ. We observe the following sequence: (H, H, H, T, H).

Because we observed at least one H and at least one T, the posterior is proper. What is the posterior distribution for θ?

- Beta(4.5, 1.5)
- Beta(4,1)
- Beta(2,5)
- Beta(5,2)
- Beta(1.5, 4.5)
- Beta(1,4)

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1 point

2.

Continuing the previous question, what is the posterior mean for θ? Round your answer to one decimal place.

Enter answer here

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1 point

3.

Consider again the thermometer calibration problem from Lesson 10.

Assume a normal likelihood with unknown mean θ and known variance $\sigma^2 = 0.25$. Now use the non-informative (and improper) flat prior for θ across all real numbers. This is equivalent to a conjugate normal prior with variance equal to ∞.

- You collect the following $n = 5$ measurements: (94.6, 95.4, 96.2, 94.9, 95.9). What is the posterior distribution for θ?

- $\mathrm{N}(96.0, 0.05^2)$
- $\mathrm{N}(95.4, 0.05)$
- $\mathrm{N}(96.0, 0.25^2)$
- $\mathrm{N}(95.4, 0.25)$

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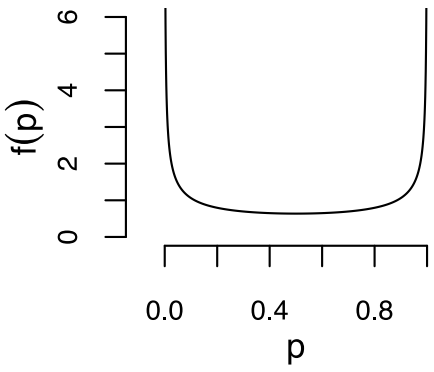
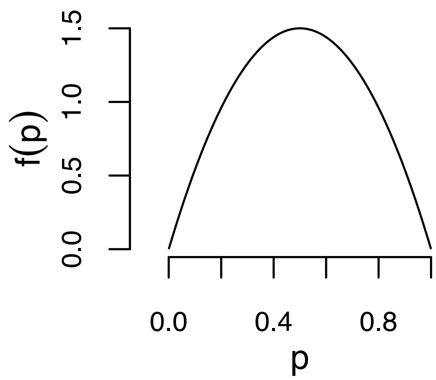
1 point

4.

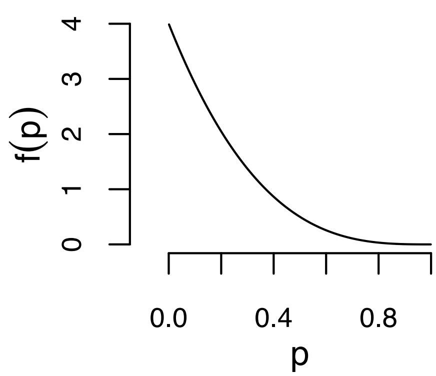
Which of the following graphs shows the Jeffreys prior for a Bernoulli/binomial success probability p?

Hint: The Jeffreys prior in this case is Beta(1/2, 1/2).

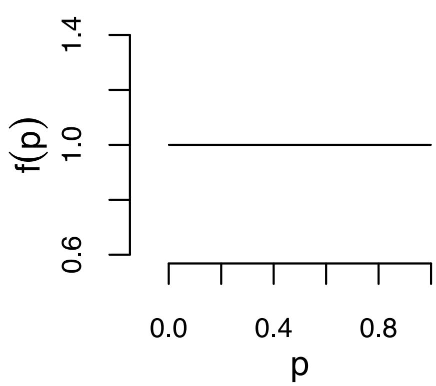




f(p)
0.0
0.5
1.0
1.5
0.0
0.4
0.8
p



f(p)
0
1
2
3
4
0.0
0.4
0.8
p



f(p)
0.6
1.0
1.4
0.0
0.4
0.8
p

1 point

5.

Scientist A studies the probability of a certain outcome of an experiment and calls it θ. To be non-informative, he assumes a Uniform(0,1) prior for θ.

Scientist B studies the same outcome of the same experiment using the same data, but wishes to model the odds $\phi = \frac{\theta}{1-\theta}$. Scientiest B places a uniform distribution on ϕ. If she reports her inferences in terms of the probability θ, will they be equivalent to the inferences made by Scientist A?

- Yes, they both used uniform priors.
- Yes, they used the Jeffreys prior.
- No, they are using different parameterizations.
- No, they did not use the Jeffreys prior.

I, **Md Yousuf Ali**, understand that submitting work that isn't my own may result in permanent failure of this course or deactivation of my Coursera account.

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