Week 2 Lab

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13/14 points earned (92%)

Quiz passed!

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1 / 1 points

1.
Suppose the posterior distribution of μ follows a Normal distribution with mean 10 and variance 5. Which of the following are the bounds of a 95% credible interval for μ? Answer this question using the app.

- (-1.96, 1.96)
- (0.419, 0.872)
- (0.959, 3.417)
- (5.618, 14.382)

Correct Response

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1 / 1 points

2.
Suppose the posterior distribution of p follows a Beta distribution with $\alpha = 2$ and $\beta = 5$. Which of the following are the bounds of a 90% credible interval for p? Answer this question using the app.

- (-1.678, 5.678)
- (0.043, 0.641)
- (0.063, 0.582)

Correct Response

- (0.071, 0.949)

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1 / 1 points

3.

Suppose the posterior distribution of λ follows a Gamma distribution with $\alpha = 4$ and $\beta = 8$. Which of the following are the bounds of a 99% credible interval for λ? Answer this question using the app.

- (-3.284, 11.284)
- (0.069, 0.693)
- (0.084, 1.372)

Correct Response

- (0.171, 0.969)

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1 / 1 points

4.

What is the 95% credible interval for p, the proportion of females in the population, based on the posterior distribution obtained with the updating rule shown above. Use the credible interval app to answer this question.

- (0.500, 0.536)
- (0.504, 0.532)

Correct Response

- (0.507, 0.530)
- (0.468, 0.496)

1 / 1 points

5.
Which of the following is the correct Bayesian interpretation of this interval?

- The probability that the true proportion of females lies in this interval is either 0 or 1.
- The probability that the true proportion of females lies in this interval is 0.95.

Correct Response

- 95% of the time the true proportion of females is in this interval.
- 95% of true proportions of females are in this interval.

1 / 1 points

6.
What is the 95% credible interval for p, the proportion of females in the population, based on a prior distribution of $Beta(a = 500, b = 500)$.
Hint: You need to determine the posterior distribution first, and then you can use the app to construct the credible interval.

- (0.498, 0.531)
- (0.500, 0.528)
- (0.504, 0.532)
- (0.502, 0.527)

Correct Response

1 / 1 points

7.
Which is of the following is the center of the $Beta(a = 5, b = 200)$ distribution?

- [x] approximately 0.03

Correct Response

- [ ] approximately 0.15
- [ ] approximately 0.50
- [ ] approximately 0.97

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1 / 1 points

8.
What is the 95% credible interval for p, the proportion of females in the population, based on a prior distribution of $Beta(a = 5, b = 200)$. Hint: You need to determine the posterior distribution first, and then you can use the app to construct the credible interval.

- [ ] (0.503, 0.531)
- [ ] (0.499, 0.535)
- [ ] (0.486, 0.509)
- [x] (0.484, 0.511)

Correct Response

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1 / 1 points

9.
What is the 90% credible interval for p, the proportion of Americans who exercise, based on a uniform prior distribution?

- [ ] (0.762, 0.785)
- [x] (0.764, 0.783)

Correct Response

- (0.718, 0.737)
- (0.758, 0.789)

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1 / 1 points

10.

Using the multi-observation updating rule, what should the posterior distribution be when the hyperparameters of a Gamma prior are $a = 4$ and $b = 1$ and we observe $x = \{2, 3, 4, 5, 4\}$.

- Gamma(a = 22, b = 6)

Correct Response

- Gamma(a = 18, b = 5)
- Gamma(a = 18, b = 6)
- Gamma(a = 19, b = 8)

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0 / 1 points

11.

The government recommends that Americans consume approximately 5 servings of fruits per day. Which of the following represents a weak prior that Americans on average follow this recommendation.

- Gamma(a = 1, b = 5)
- Gamma(a = 5, b = 1)
- Gamma(a = 100, b = 500)
- Gamma(a = 500, b = 100)

Incorrect Response

1 / 1 points

12.

Using the correct prior distribution from the previous question, calculate the parameters of the posterior distribution.

- Gamma(a = 8114, b = 5000)
- Gamma(a = 8118, b = 5001)
- Gamma(a = 8119, b = 5001)

Correct Response

- Gamma(a = 8115, b = 5005)

1 / 1 points

13.

Using the correct posterior distribution from the previous question, calculate the 90% credible interval for λ, the expected number of servings of fruit Americans consume per day.

- (1.594, 1.653)

Correct Response

- (1.588, 1.659)
- (1.592, 1.651)
- (1.575, 1.668)

1 / 1 points

14.