Week 2 Lab

Quiz, 14 questions

14/14 points (100%)

Congratulations! You passed!

Next Item

1 / 1 point

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
Correct.

---

1 / 1 point

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
Correct.

(0.071, 0.949)

Week 2 Lab

Quiz, 14 questions

14/14 points (100%)

1 / 1 point

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

Correct.

(0.171, 0.969)

1 / 1 point

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)

(0.503, 0.531)

Correct

Correct.

(0.507, 0.530)

(0.468, 0.496)

1 / 1

point

Week 2 Lab

Quiz, 14 questions

14/14 points (100%)

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

Correct. The credible interval of the parameter p gives us the range where the probability that p lies in is 0.95.

- 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 point

6.

What is the 95% credible interval for p, the proportion of females in the population, based on a prior distribution of $\text{Beta}(a = 500, b = 500)$. **Hint:** You need to determine the hyperparameters of the posterior distribution, then 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

Correct.

---

1 / 1 point

7.

Which is of the following is the center of the $\text{Beta}(a = 5, b = 200)$ distribution? **Hint:** modify the code under the distribution plot to get the center.

approximately 0.03

Week 2 Lab

Quiz, 14 questions

14/14 points (100%)

Correct

Correct.

approximately 0.15

approximately 0.50

approximately 0.97

---

1 / 1 point

8.

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

(0.503, 0.531)

(0.499, 0.535)

(0.486, 0.509)

(0.484, 0.511)

Correct

Correct.

---

1 / 1 point

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)

(0.764, 0.783)

Correct

Correct.

Week 2 Lab

Quiz, 14 questions

14/14 points (100%)

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

---

1 / 1 point

10.

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

- $\text{Gamma}(k = 22, \theta = 6)$

Correct

Correct.

- $\text{Gamma}(k = 18, \theta = 5)$
- $\text{Gamma}(k = 18, \theta = 6)$
- $\text{Gamma}(k = 19, \theta = 8)$

---

1 / 1 point

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?

- $\text{Gamma}(a = 1, b = 5)$
- $\text{Gamma}(a = 5, b = 1)$

Correct

Correct.

- $\text{Gamma}(a = 100, b = 500)$

$\text{Gamma}(a = 500, b = 100)$

Week 2 Lab

Quiz, 14 questions

14/14 points (100%)

1 / 1 point

12.
Using the correct prior distribution from the previous question and the data of **`fruit_per_day`** in the **BRFSS** dataset, calculate the hyperparameters of the posterior distribution.

- $\text{Gamma}(\alpha = 8114, \beta = 5000)$
- $\text{Gamma}(\alpha = 8118, \beta = 5001)$
- $\text{Gamma}(\alpha = 8119, \beta = 5001)$

Correct
Correct.

- $\text{Gamma}(\alpha = 8115, \beta = 5005)$

1 / 1 point

13.
Using the least informative posterior distribution from the previous question, calculate the 90% credible interval for λ, the expected number of servings of fruit Americans consume per day.

- (1.575, 1.668)
- (1.588, 1.659)
- (1.592, 1.651)
- (1.594, 1.653)

Correct
Correct.

1 / 1 point

Week 2 Lab

Quiz, 14 questions

14/14 points (100%)

14.

Based on this result, do Americans appear to follow the government guidelines which recommend consuming 5 servings of fruits per day?

- Yes
- No

Correct

Correct. The parameter λ represents the number of fruits consumed per day.