Week 2 Lab

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14/14 points earned (100%)

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

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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

- (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

- (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)
- (0.503, 0.531)

Correct

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

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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

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

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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

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

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

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

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)
- (0.764, 0.783)

Correct

- (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

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

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1 / 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)

Correct

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

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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

- Gamma(a = 8115, b = 5005)

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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

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

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1 / 1 points

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
