

Answers to Exam 2 Practice Questions: STAT 638, Fall 2016

1. (c)
2. (a)
3. (c)
4. (b)
5. (d)
6. (a)
7. (d)
8. (b)
9. (c)
10. (d)

11.

(a) $10.8 \pm 1.96\sqrt{64.1}/\sqrt{5000} = 10.8 \pm 0.22$

(b) $10.8 \pm 1.96\sqrt{64.1} = 10.8 \pm 15.70$

- (c) Yes you are, because the inverse of the information matrix (evaluated at the MLE) is approximately the covariance matrix of the posterior distribution, which may be estimated from the given information. The matrix is

$$\begin{bmatrix} 64.1 & 1.125 \\ 1.125 & 7.9 \end{bmatrix}.$$

- (d) The correlation between θ_1 and θ_2 , given the data, is approximately $1.125/\sqrt{64.1 \cdot 7.9} = 0.05$. Therefore, θ_1 and θ_2 are practically independent, given the data. We can therefore find separate credible intervals for θ_1 and θ_2 , and multiply together the coverage probabilities to find the level of the joint credible region. The interval for θ_1 could be that in (b), and for θ_2 we may use $4.2 \pm 1.96\sqrt{7.9} = 4.2 \pm 5.51$. The probability that (θ_1, θ_2) is in the rectangle defined by the intersection of these two intervals is $0.95^2 = 0.9025$.

12. (a)
13. (d)
14. (c)
15. (c)