

MATH 392 Problem Set 2

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Exercises from the book

7.2: 1, 2, 3, 5, 8, 10

7.2.1

7.2.2 Note: via Equation 7.2.11: $f_n(x | \theta) = \theta^y(1 - \theta)^{n-y}$

For $n = 8, y = 2$ $f_n(x | \theta \text{ right}) = \theta^2(1 - \theta)^6$

Given, $\xi(0.1) = 0.7$ and $\xi(0.2) = 0.3$

$$\xi(0.1 | x) = Pr(\theta = 0.1 | x)$$

$$= \frac{\xi(0.1)f_n(x|0.1)}{\xi(0.1)f_n(x|0.1)+\xi(0.2)f_n(x|0.2)}$$

$$= \frac{(0.7)(0.1)^2(0.9)^2}{(0.7)(0.1)^2(0.9)^2+(0.3)(0.2)^2(0.8)^2}$$

$$= 0.5418$$

Note: $\xi(0.2 | x) + \xi(0.1 | x) = 1$

Hence: $\xi(0.2 | x) = 1 - \xi(0.1 | x)$

$$= 1 - \frac{(0.7)(0.1)^2(0.9)^2}{(0.7)(0.1)^2(0.9)^2+(0.3)(0.2)^2(0.8)^2}$$

$$= 1 - 0.5418 = 0.4582$$

Thus, the posterior pdf of θ is

7.2.3

7.2.5

7.2.8

7.2.10 **7.3:** 10, 21

7.3.10

7.3.21 **7.4:** 5, 12

7.4.5

7.4.12 For 7.4.12, use the `prop_model()` function in the slides to visualize the prior and posterior distributions of statisticians A and B.