Problem 6.3.2

Beta(2+3, 200+100-3)

Problem 6.3.4

Gamma(3+13, 1+5)

Problem 6.3.6

$$\begin{aligned} \mu_1 &= \frac{\sigma^2\mu + n\nu^2\bar{x_n}}{\sigma^2 + n\nu^2} = 69.07 \\ \nu_1^2 &= \frac{\sigma^2\nu^2}{\sigma^2 + n\nu^2} = 0.286 \end{aligned}$$

The posterior is N(69.07, 0.286)

Problem 6.5.1

$$p = \frac{58}{70} = 0.829$$

Problem 6.5.2

$$p = \frac{2}{3}$$

Problem 6.5.5

$$\hat{\sigma^2} = \frac{1}{n}\sum_{i=1}^{n}(X_i - \mu)^2$$

Problem 6.5.8

$$\theta = \frac{-n}{\sum_{i=1}^{n} log(X_i)}$$

Problem 6.6.1

$$\begin{aligned} \hat{\theta} &= \bar{X}_n \\ \hat{sigma} &= \sqrt{\hat{\theta}} = \sqrt{\bar{X}_n} \end{aligned}$$

Problem 6.6.2

$$\hat{\beta} = \frac{1}{\bar{X}_n}$$

Plug $\hat{\beta}$ in and calculate the median, we get

$$\hat{m} = \bar{X}_n \log 2$$

Problem 6.6.13

Different mechanism has similar likelihood function. The first one is negative binomial, the second is binomial.

(a) $p = \frac{5}{43}$

(b) $p = \frac{3}{58}$

Problem 6.7.1

$$f_n(x|p) = p^T(1-p)^{n-T}$$

where $T = \sum_{i=1}^{n} X_i$

Problem 6.7.2

$$f_n(x|p) = p^{T-n}(1-p)^T$$

where $T = \sum_{i=1}^{n} X_i$