Bayes Class 2

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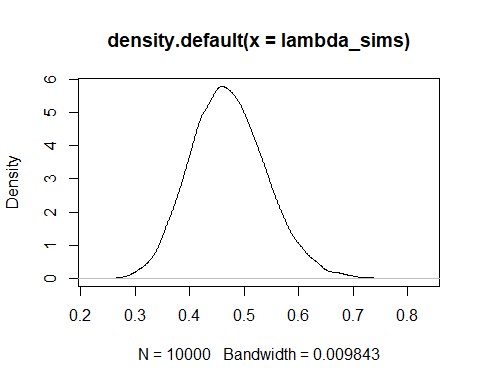
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# Bayes’ Theorem

x <- c(7, 15, 5, 11, 14, 10, 20, 10, 4)  
n <- length(x)

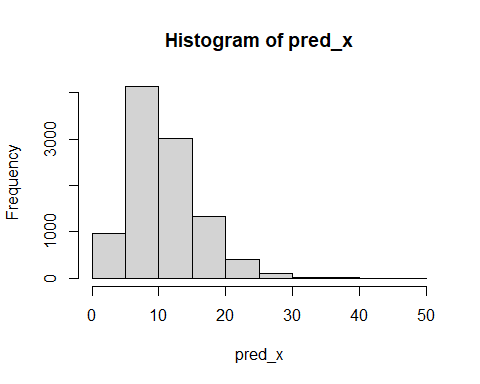
nsims <- 10000  
lambda\_sims <- rgamma(nsims, 5\*n+0.5, sum(x) + 0.5)

lambda\_sims |> density() |> plot()



rgamma(nsims, 5, lambda\_sims) -> pred\_x

hist(pred\_x)



What is the probability of waiting more than 15 minutes?

mean(pred\_x>15)

## [1] 0.1893

What is the probability that the longest wait of a random sample of 10 people is longer than 15 minutes?

lambda\_sims |> sapply(\(l) {  
 rgamma(10, 5, l) |> max()  
}) -> maximums  
mean(maximums > 15)

## [1] 0.7935

mean(pred\_x)

## [1] 10.8037

quantile(pred\_x, c(0.025, 0.975))

## 2.5% 97.5%   
## 3.354633 22.783662