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Bayesian Stats

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1. install.packages("TeachBayes")

library(TeachBayes)

bayes\_table <- data.frame(p = seq(.3, .8, by=.1),

Prior = c(0.125, 0.125, 0.250,

0.250, 0.125, 0.125))

bayes\_table$Likelihood <- dbinom(10, size=30, prob=bayes\_table$p)

bayesian\_crank(bayes\_table) -> bayes\_table

bayes\_table

sum(bayes\_table$Posterior[bayes\_table$p == 0.3])

sum(bayes\_table$Posterior[bayes\_table$p > 0.5])

sum(bayes\_table$Posterior[bayes\_table$p <= 0.4]) -

sum(bayes\_table$Posterior[bayes\_table$p <= 0.2])

a. 0.4469407  
b. 0.01270655  
c. 0.8106056

1. a. The Beta(1,1) curve represents the prior belief that all values are equally probable. The owner of Tokyo Express thinks that their customers are equally split on how they feel about Friday.  
   b. The Beta(0.5,1) curve represents the prior belief that the lower probabilities are most probable. The owner of Tokyo Express thinks that the majority of their customers do not like Fridays.  
   c. The Beta(4,2) curve represents the prior belief that the upper middle probabilities (0.5 - 0.8) are the most probably. The owner of Tokyo Express thinks that the majority of their customers are generally like Fridays.  
   d. Beta(4,1) and Beta(4,2) curves are different in that Beta(4,1) includes the upper extreme end. The owner of Tokyo Express thinks that almost all of their customers really love eating out on Fridays. But Beta(4,2) does not include the upper extreme end so the owner of Tokyo Express would think that the majority of their customers like eating out on Fridays, but there are still some who don’t.
2. p <- c(0.1, 0.5, 0.9, 1.50)

pbeta(p, 0.5, 0.5)

dbeta(0.6, 6, 3) - dbeta(0.2, 6, 3)

vector <- c(0.1, 0.5, 0.9, 1.5)

pbeta(vector, 10,10)

qbeta(pbeta(vector, 10, 10), 10, 10)

rbeta(100, 4, 2)  
  
a. 0.2048328 0.5000000 0.7951672 1.0000000  
b. 2.055782  
c. 0.1 0.5 0.9 1.0  
d. 0.6449913 0.7778856 0.4828286 0.7380237 0.6751253 0.5587870

[7] 0.2292091 0.7328034 0.4509303 0.9615479 0.7704921 0.8904855

[13] 0.3790133 0.7025199 0.7483567 0.3087833 0.8365400 0.5640763

[19] 0.8826509 0.7646072 0.2440838 0.2871082 0.3802188 0.7820890

[25] 0.9474778 0.8758955 0.4236354 0.7286000 0.9653636 0.7058413

[31] 0.2977291 0.5078711 0.8245422 0.9184563 0.8253842 0.6588780

[37] 0.4414494 0.9516586 0.4040466 0.6654415 0.5273722 0.9287025

[43] 0.7989232 0.7594501 0.3983022 0.4026662 0.5622371 0.7719963

[49] 0.4070068 0.6746784 0.7990414 0.4317058 0.3055489 0.4441553

[55] 0.7708889 0.7635146 0.3064711 0.5829846 0.4575259 0.7382261

[61] 0.3382128 0.8225424 0.5126913 0.8238905 0.8965236 0.6354048

[67] 0.4428685 0.9372622 0.8855219 0.2080788 0.7567264 0.5440917

[73] 0.7741125 0.7302155 0.6468143 0.6642036 0.7084395 0.7635163

[79] 0.9931154 0.2020413 0.8659456 0.7032930 0.3071179 0.4109600

[85] 0.3339443 0.8619076 0.8703197 0.4781589 0.6342364 0.7509371

[91] 0.7462259 0.8504836 0.6462904 0.6060480 0.6180197 0.7453979

[97] 0.8703948 0.6073824 0.9614790 0.9050893