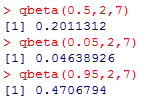
**Problem 3.1:**

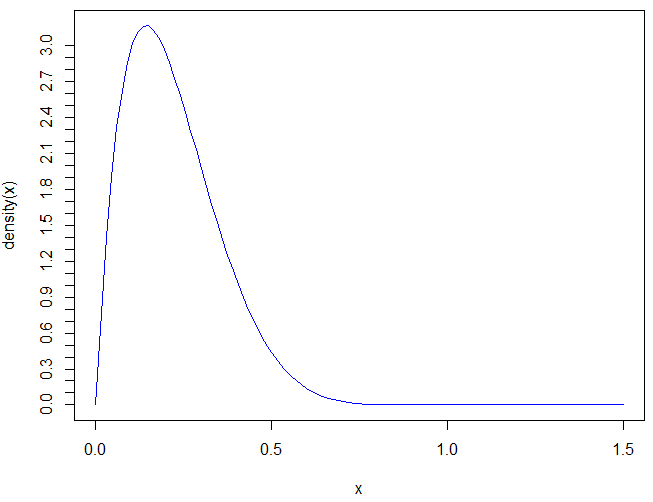
1.

The mean is

The mode is

2. The median is **0.2011**

The 90% central interval is **[0.0464, 0.4707]**

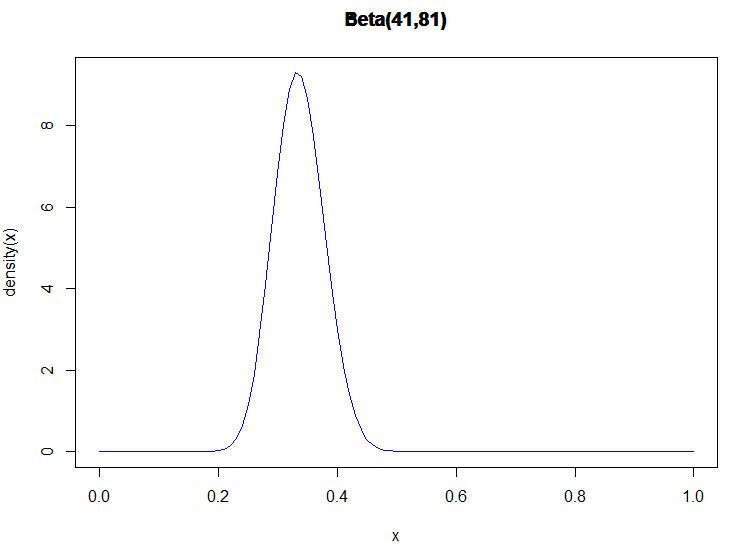
3. The beta(2,7) plot is:

**Problem 3.3:**

1. uniform(0,1) = **beta (1,1)**

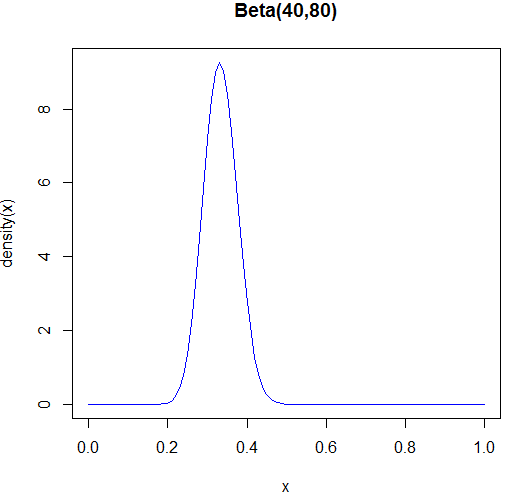
2. Since the desired sample size for beta (1,1) is 1+1-2 = 0. The desired equivalent prior sample size for U(0,1) is also 0.

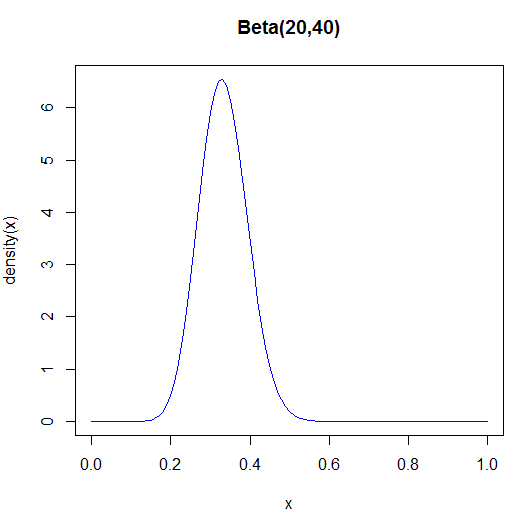
**Problem 3.4:**

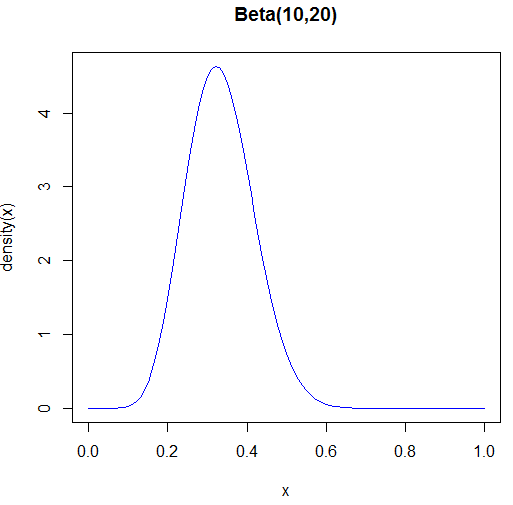
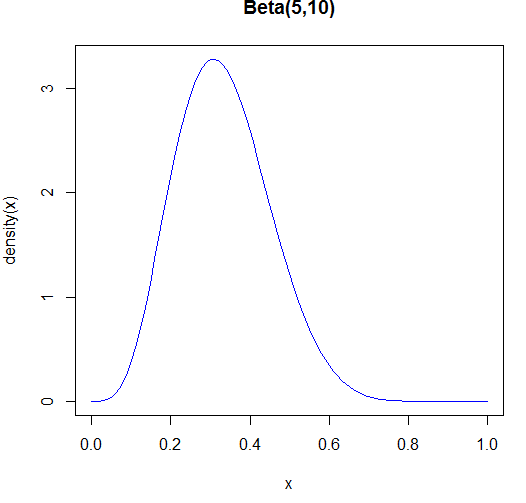
1. , we plot the density function of beta (41, 81):

We notice that the distribution is concentrated between 0.3 to 0.4.We need to use the probability of a sample high school student getting hit to estimate .

The probability P(getting hit) . It’s within the interval of [0.3, 0.4]. Therefore **the guess of beta(41,81) is good**.

2. The player’s mother’s belief would probability want a steady hit, therefore we want the prior mean to be 0.333. We could try beta(40,80), beta(20,40), beta (10,20) and beta(5,10).

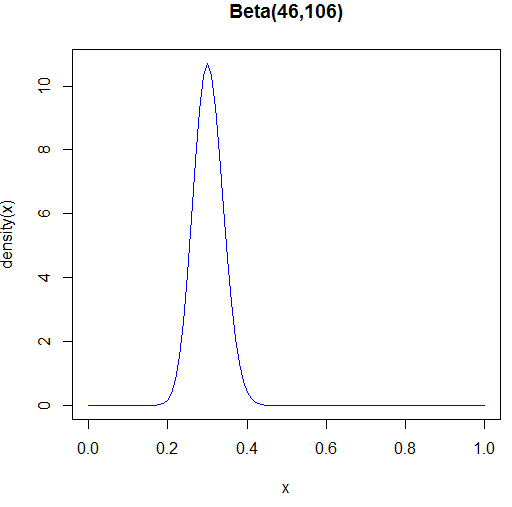




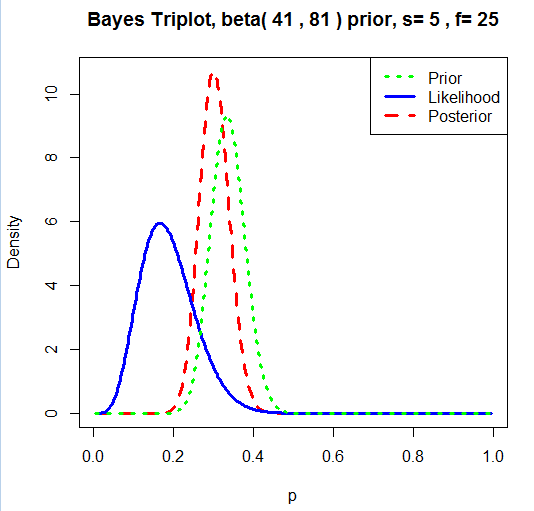
The plots indicate that, when the sum of is larger, the distribution is more concentrated. To get a more certain outcome of getting a hit at bat, the **beta(40,80) would be the best fit** in all.

3. One of the reason of dependence might be that the players’ performances would go down since the eight college-levels games are very exhausting. **The model might not be independent**.

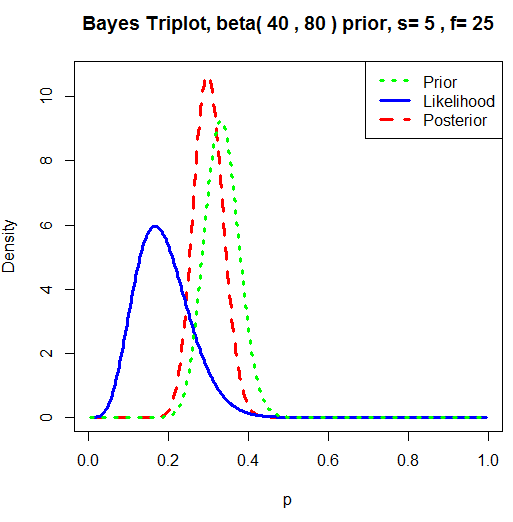
4. (a) Posterior: probability of getting a hit at bat based on player’s latest record.

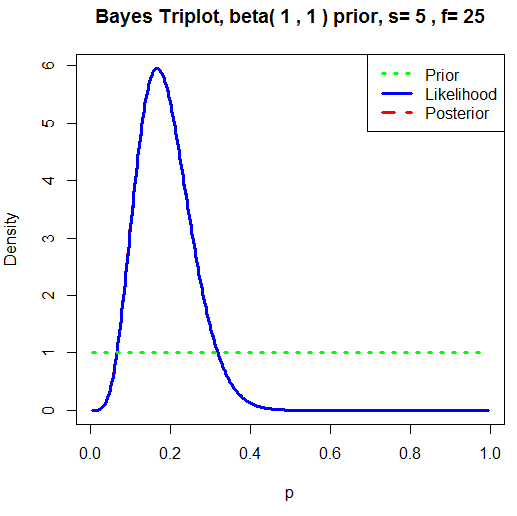
The likelihood function is . The posterior is proportional to beta(.

(b) Here we plot **Beta(46,106).**

(c)

(1)

(2)



(3)