3 (b)

```
dirichlet <- function(a, n){
    p <- length(a)
    # matrix: each row sample from Dirichlet(a)
    y <- array(NA, dim=c(n, p))
    for (i in 1:n) {
        tmp <- rgamma(p, a, 1)
        y[i, ] <- tmp / sum(tmp)
    }
    return(y)
}
```

Here is a simple function in R that takes as inputs n and $\boldsymbol{a} = (a_1, a_2, a_3)$ and generates a matrix of size n3 whose rows correspond to independent samples from a Dirichlet distribution with parameter $(a_1, a_2, a_3)$.

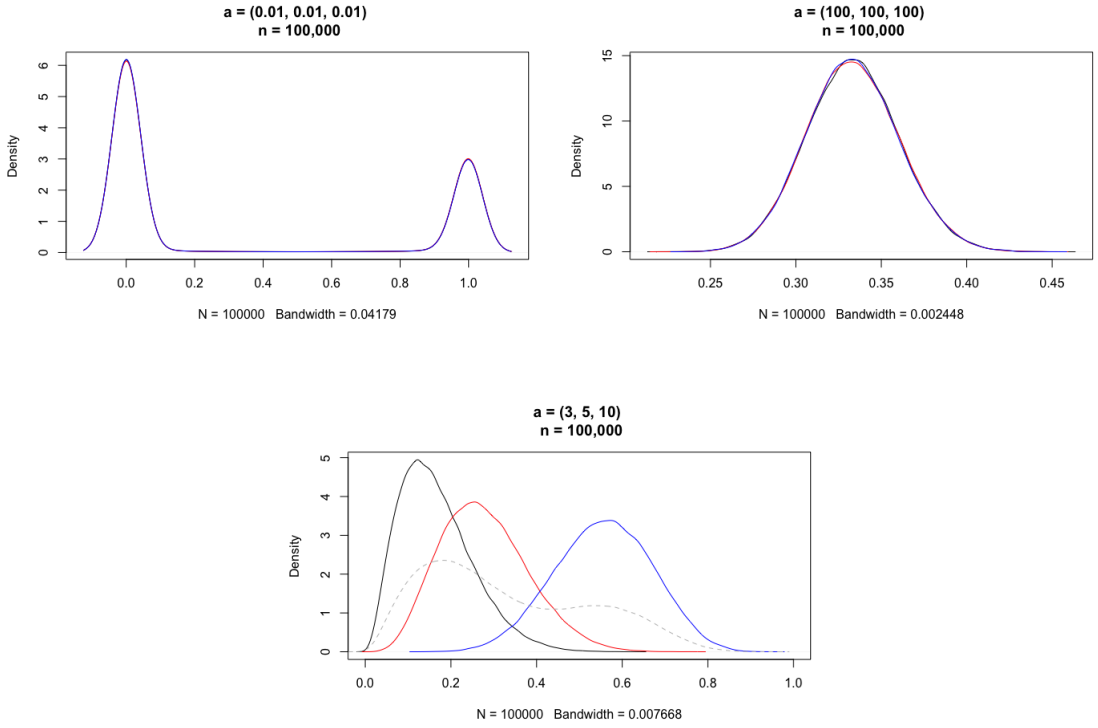


Figure 1: Black: a = 3, red: a =5, blue: red = 10

Smaller $a$ leads to a bimodal distribution. Larger $a = 100$ leads to unimodal distribution.