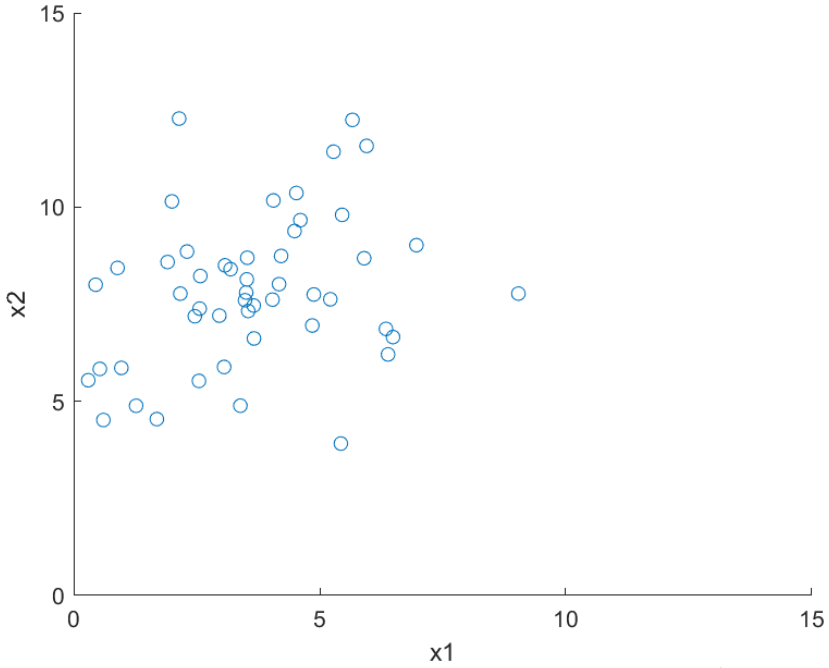
Connor Johnson

Assignment 3

1.

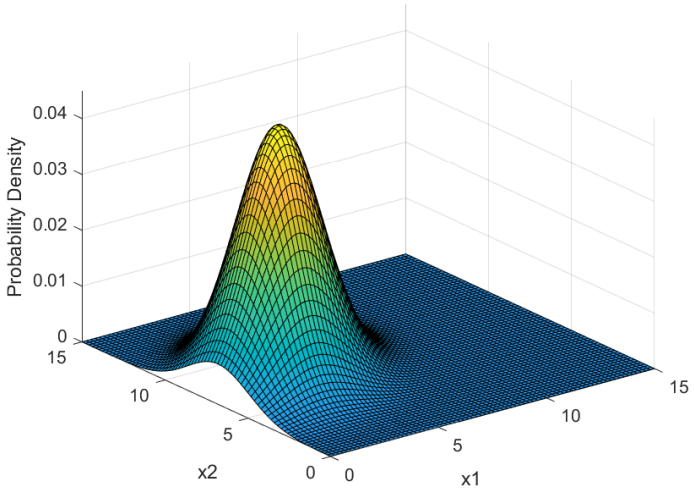
a.



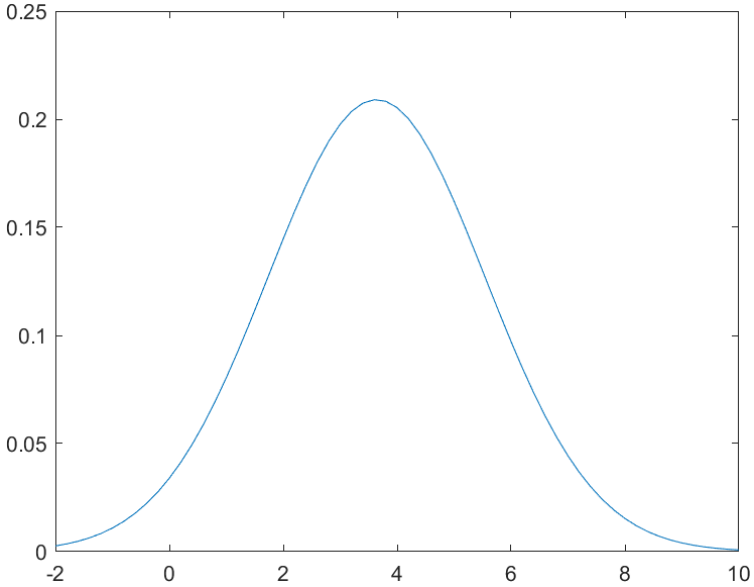
b.

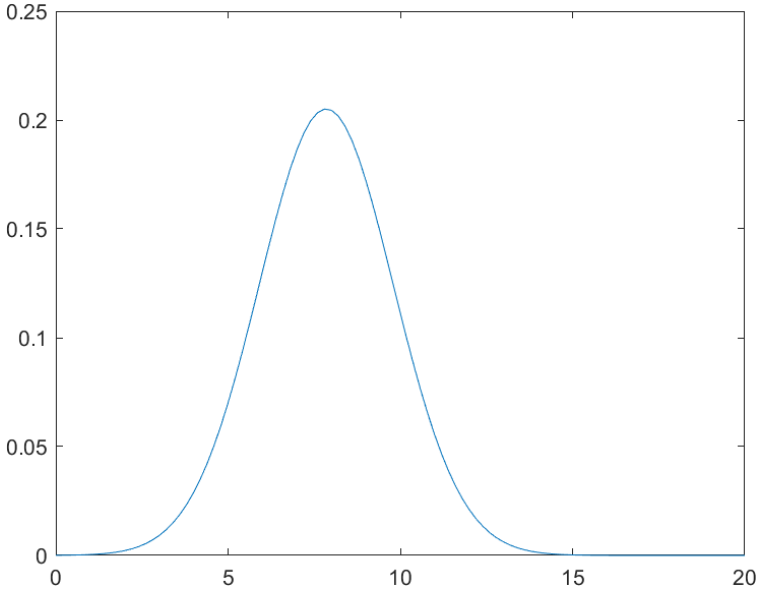
```
mu =

    3.6377    7.8506


sigma =

    3.6414    1.0779
    1.0779    3.7831
```

c.



```
mu =

    3.6377    7.8506

stdev =

    1.9083    1.9450

fx >>
```



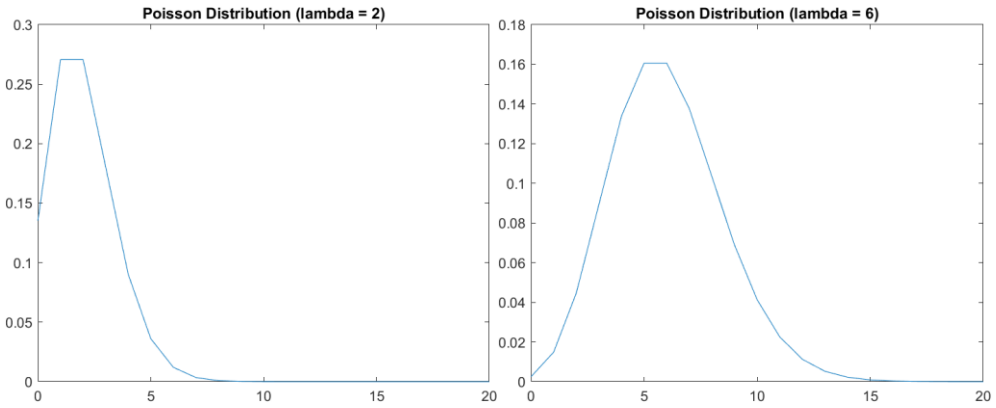


d. I believe the multivariate distribution is better because it considers the covariance between the variables in its distribution. The separate distributions treat the variables as if they're independent and they might not be.

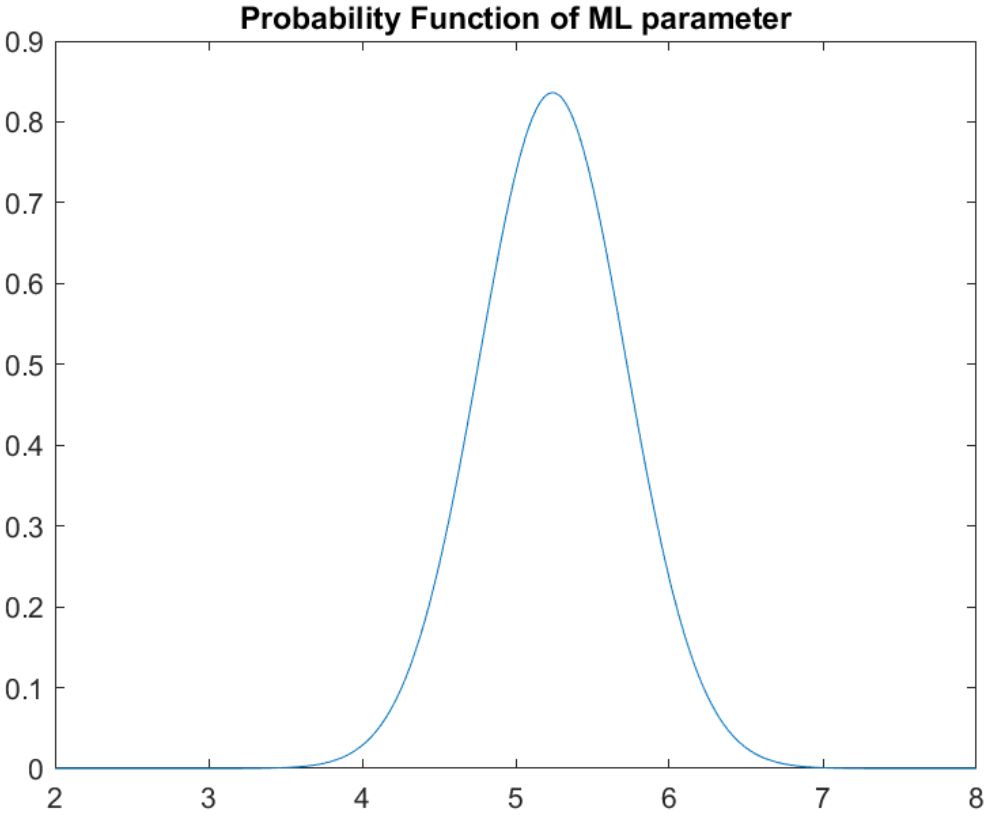
2.

a.

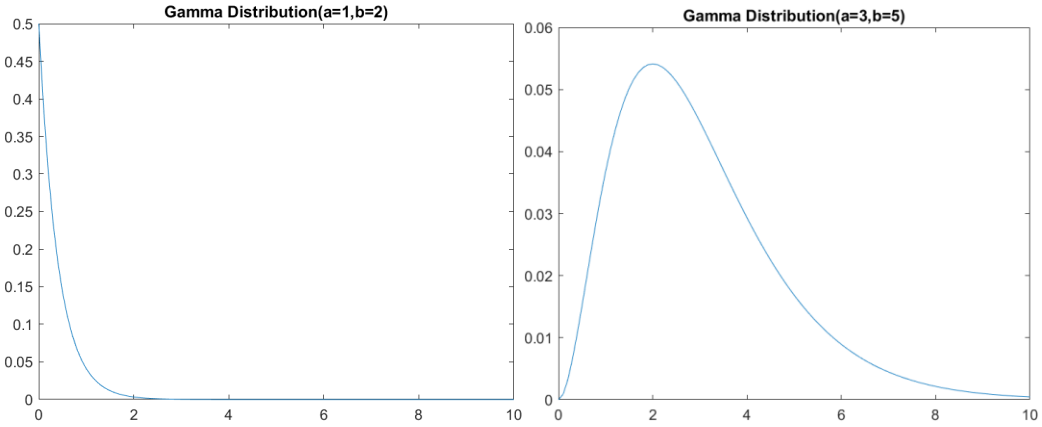
b.



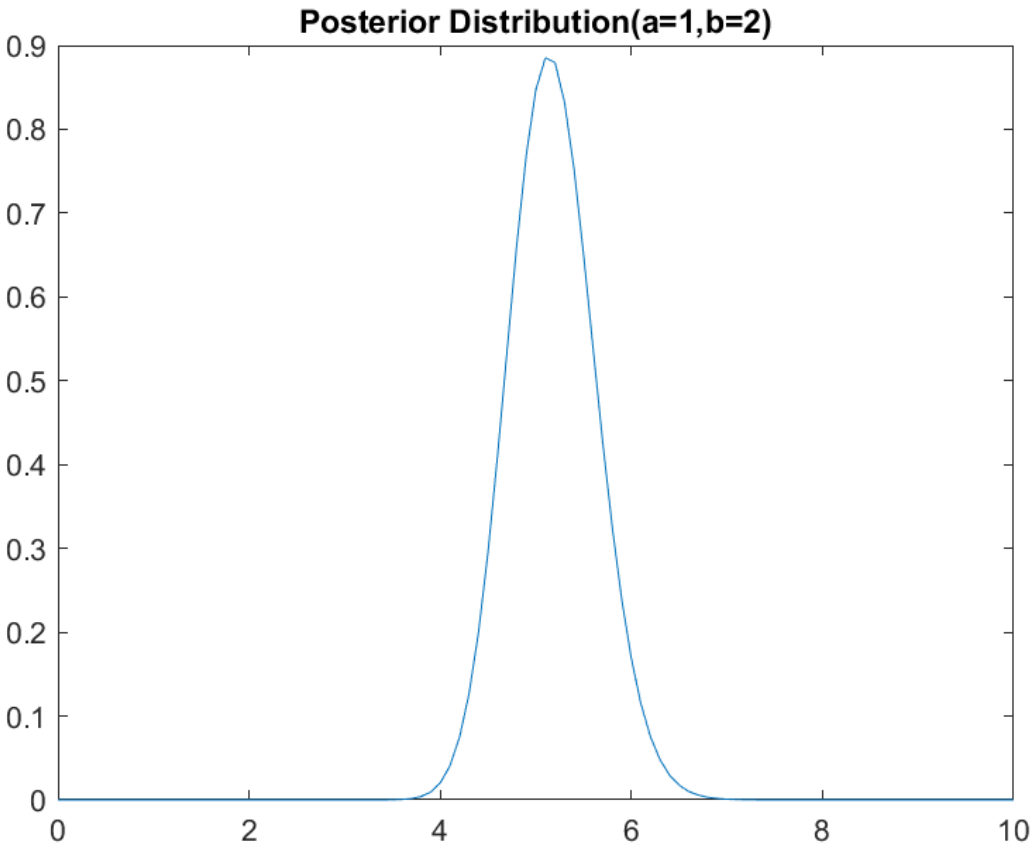
The ML estimate of the parameter is 5.24

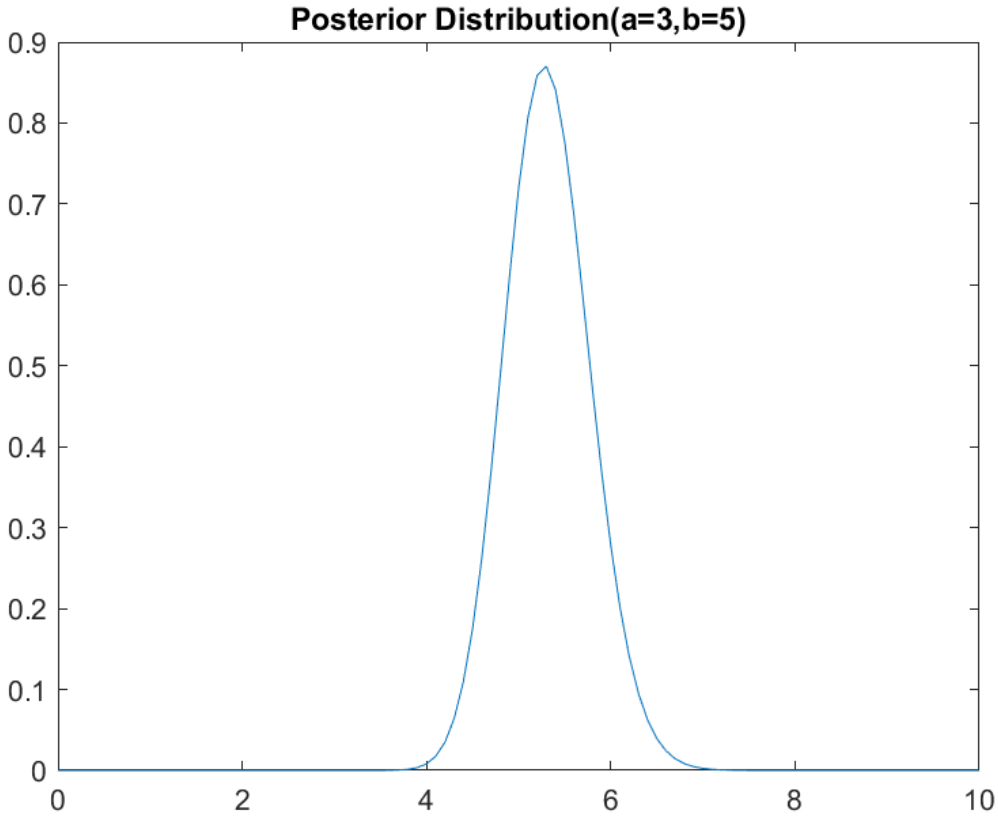


c.

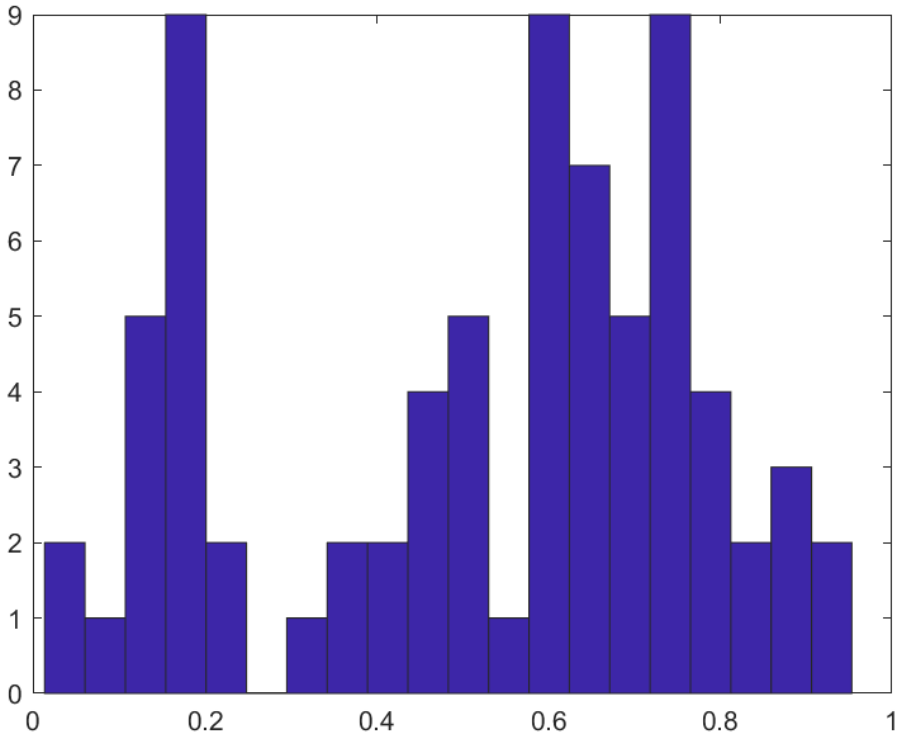

Gamma Distribution(a=1,b=2)
Gamma Distribution(a=3,b=5)

d.


Posterior Distribution(a=1,b=2)


Posterior Distribution(a=3,b=5)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
2
4
6
8
10

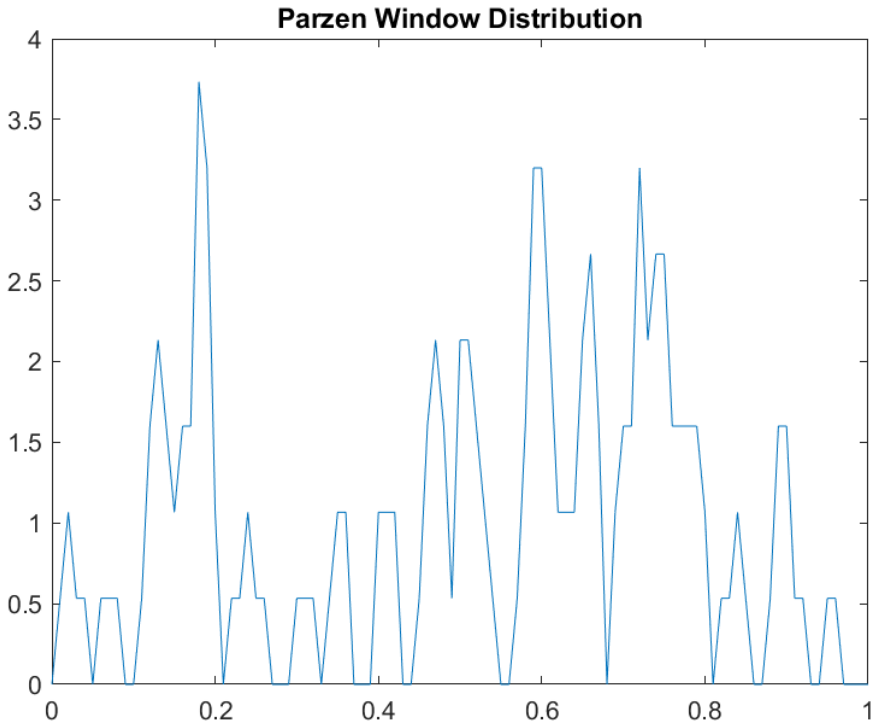
3.


9
8
7
6
5
4
3
2
1
0
0
0.2
0.4
0.6
0.8
1

Part 2

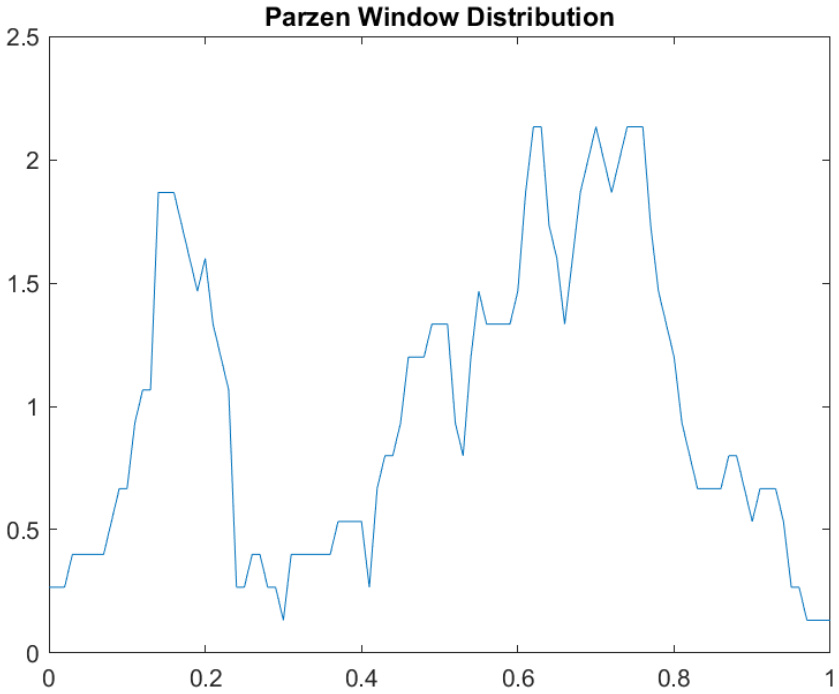
a.

```
parzen =

    1.6000
         0
         0
    2.1333
    1.6000
    2.1333
```



b.

```
parzen =

    1.4667
    0.2667
    0.9333
    1.6000
    1.3333
    1.7333
```

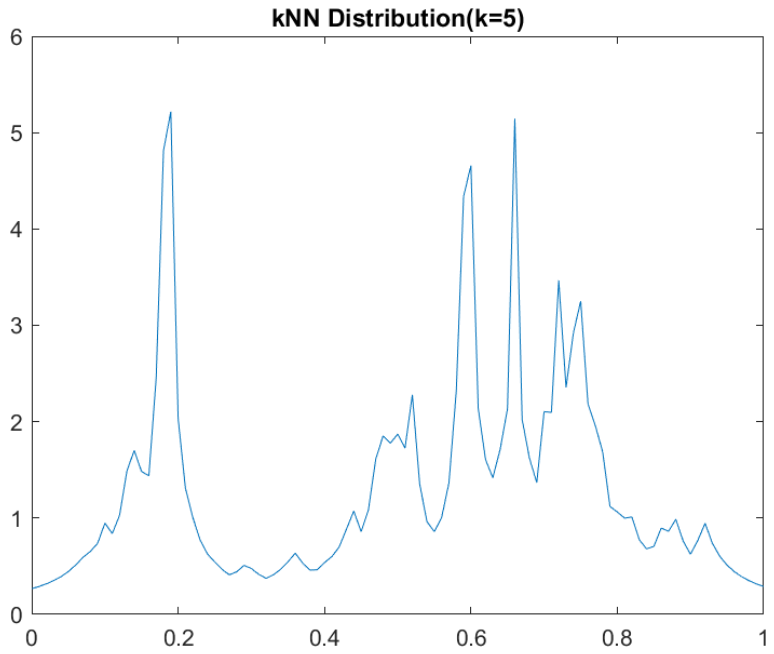


c. The results are different. The variance in the test densities is higher for the lower width parameter. The distribution for the higher parameter is much smoother than the low parameter. The low parameter distribution jumps between zero and high values

Part 3

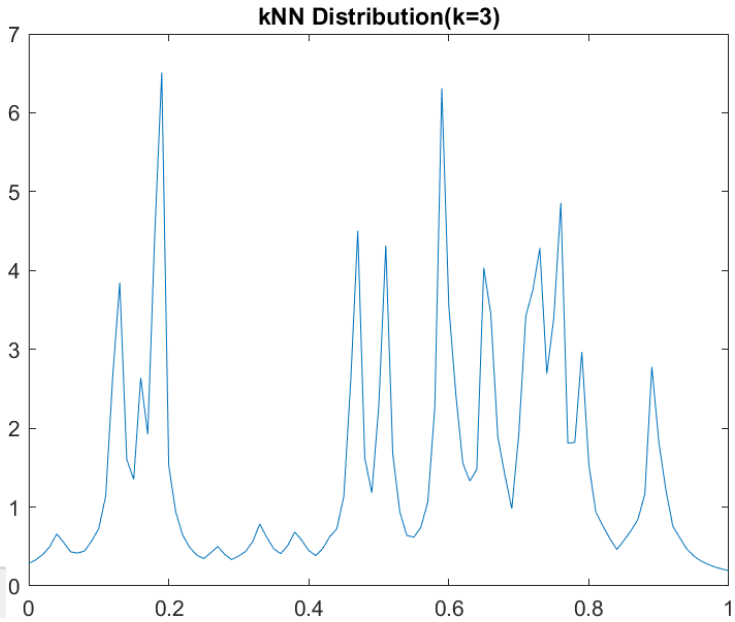
a.

```
kn =

    1.8278
    0.5311
    0.8786
    2.3900
    0.9994
    2.5931
```



b.

```
kn =

    1.7814
    0.3448
    1.0797
    3.0180
    3.0398
    2.8816

fx >>
```



c. The differences between the two are very similar between the differences between the parzen window distributions. When k is higher, there is less variance in the densities which makes the distributions much smoother. The max value of the k=3 distribution is also higher than k=5.