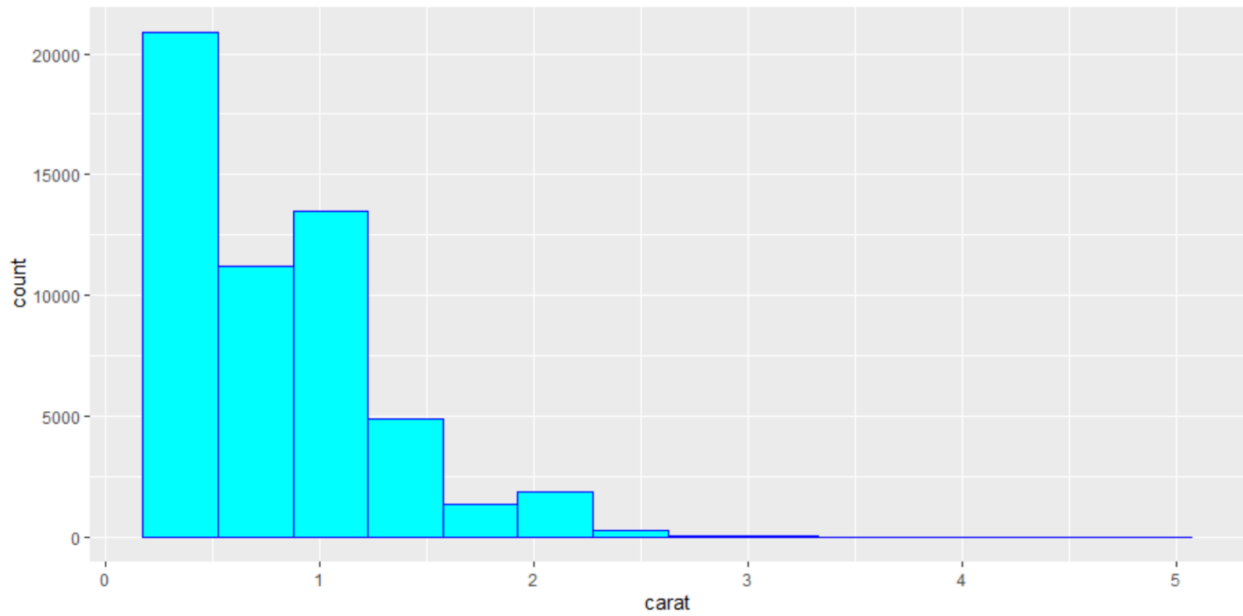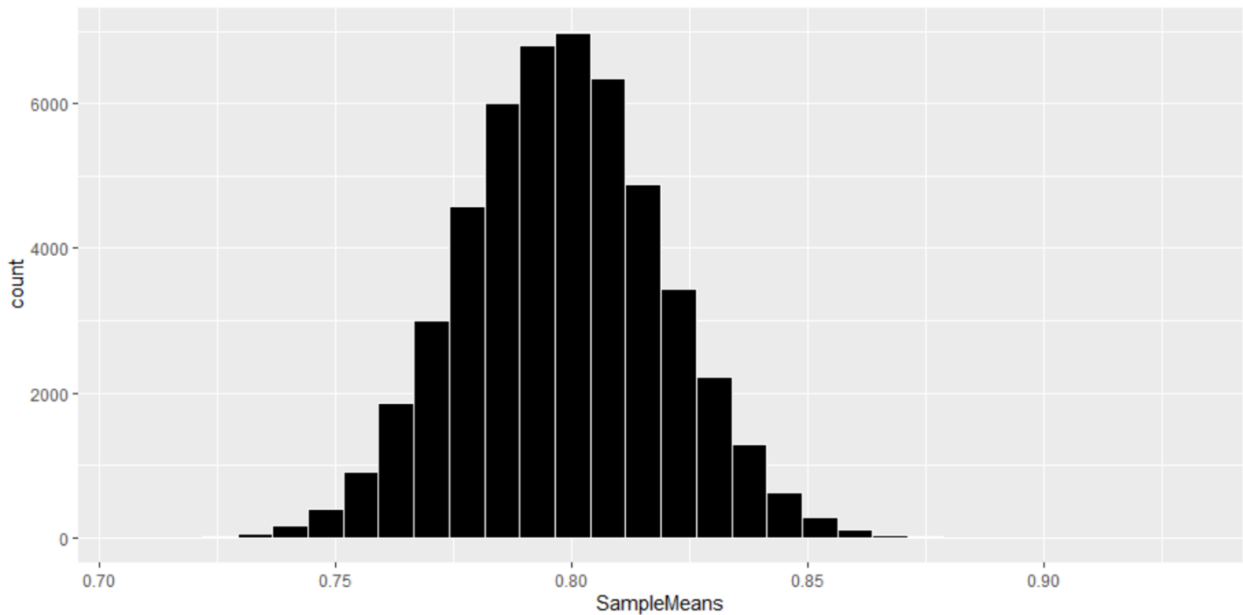Matt McCullough

1a.



The histogram is right skewed, and the mean is 0.7979397 and the standard deviation is 0.4740112

1b. I expect the distribution of the sample means to be a normal distribution due to Central Limit Theorem. The theoretical mean is 0.7979397 and the theoretical standard deviation is 0.02119843

1c.

The distribution of the histogram shows a mound like distribution that is close to normal. The mean of the sample means is 0.7981113 and the standard deviation is 0.02113361. These statistics are close to the theoretical mean as I expected them to

2a.

```
> SampleMileages
 [1] 21 21 19 15 25 29 30 20 23 28 18 25 22 23 31 26 29
[18] 19 19 25 21 30 34 33 27 22 28 19 28 32 25 32 29 29
[35] 30
```

2b. The mean of the sample is 25.34286 and the standard deviation is 4.964242. t$\alpha$/2 is 2.032245. the confidence interval is 23.63758 to 27.04813

2c. Using R to calculate the confidence interval verifying part b

```
> result = t.test(SampleMileages);
> conf = result$conf.int
> conf
[1] 23.63758 27.04813
attr(,"conf.level")
[1] 0.95
>
```

2d. the mean of all highway gas mileages lies within the confidence of the interval where the mean is 24.82342. It does not necessarily have to follow the confidence interval since there could just as easily be a sample that falls outside the interval as it isn't a 100% indicator of the true mean