

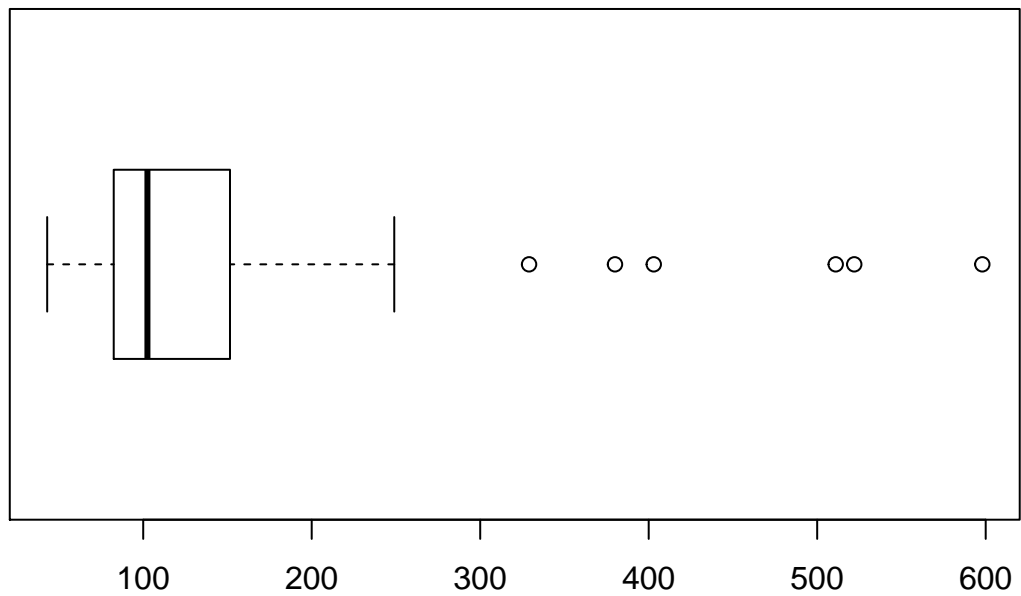
Tutorial Week 3

SID 313010374

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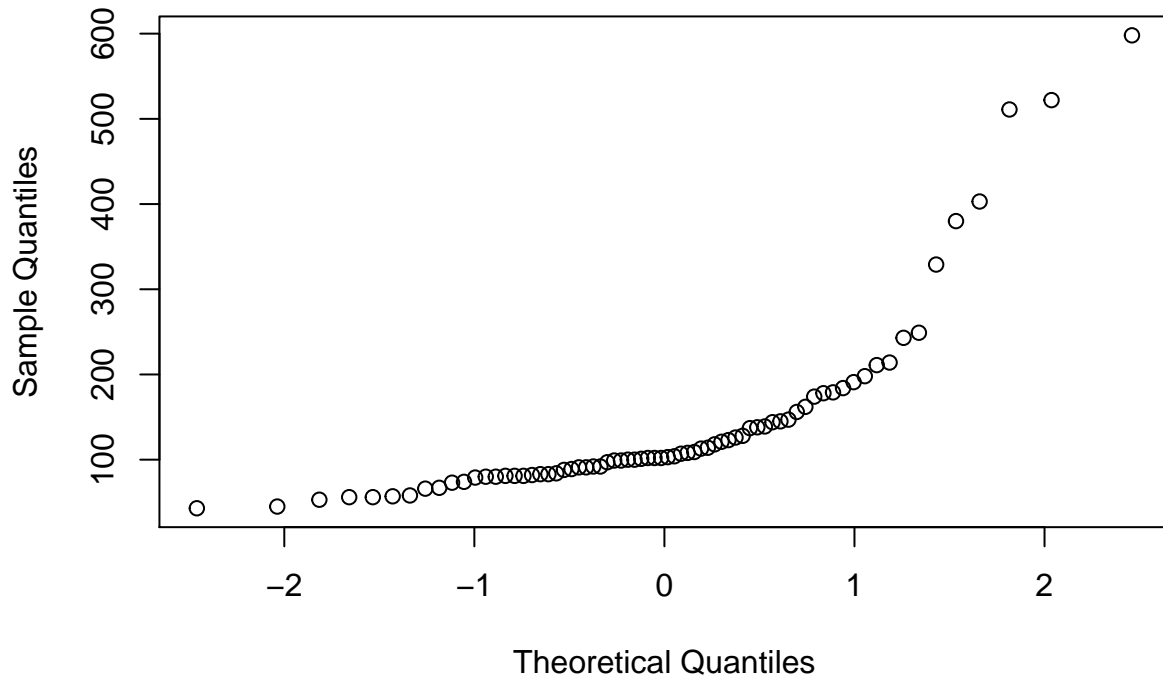
Computer Exercises

```
su <- survival  
boxplot(su, horizontal = TRUE)
```



```
qqnorm(su)
```

Normal Q-Q Plot



From this boxplot we can see that the survival rates have a substantial right-hand tail, i.e. are skewed to the right. From the qqplot we can see that this distribution is likely not normal, as in a normal qqplot the line of quantiles would be straight.

```
mean(su)
```

```
## [1] 141.8472
```

```
var(su)
```

```
## [1] 11926.53
```

This is a one-sided test of mean with $\mu = 160$. The test statistic is as follows:

```
t.obs = (mean(su) - 160)/(sqrt(var(su)/length(su)))
t.obs
```

```
## [1] -1.410433
```

Finding the p-value is then as follows:

```
pt(t.obs, length(su) - 1)
```

```
## [1] 0.0813891
```

This p-value is not heaps strong evidence that the mean is less than 160.

I already used a t-test. The p-values would be basically the same though, since $n > 30$ and so the t-distribution with 71 degrees of freedom is almost exactly normal.

Critical Values

```
crit.tdist = (qt(0.05, 71))*sqrt(var(su))/sqrt(length(su)) + 160
crit.normdist = qnorm(0.05)*sqrt(var(su))/sqrt(length(su)) + 160
```

```
crit.tdist
```

```
## [1] 138.5503
```

```
crit.normdist
```

```
## [1] 138.8301
```

The critical values are almost indistinguishable, and so we don't really care whether we use the t-distribution or the normal distribution. By either of these critical values, the observed sample mean is not significant evidence.

```
su1 <- su  
su1[4] = 2000  
mean(su1)
```

```
## [1] 168.2361
```