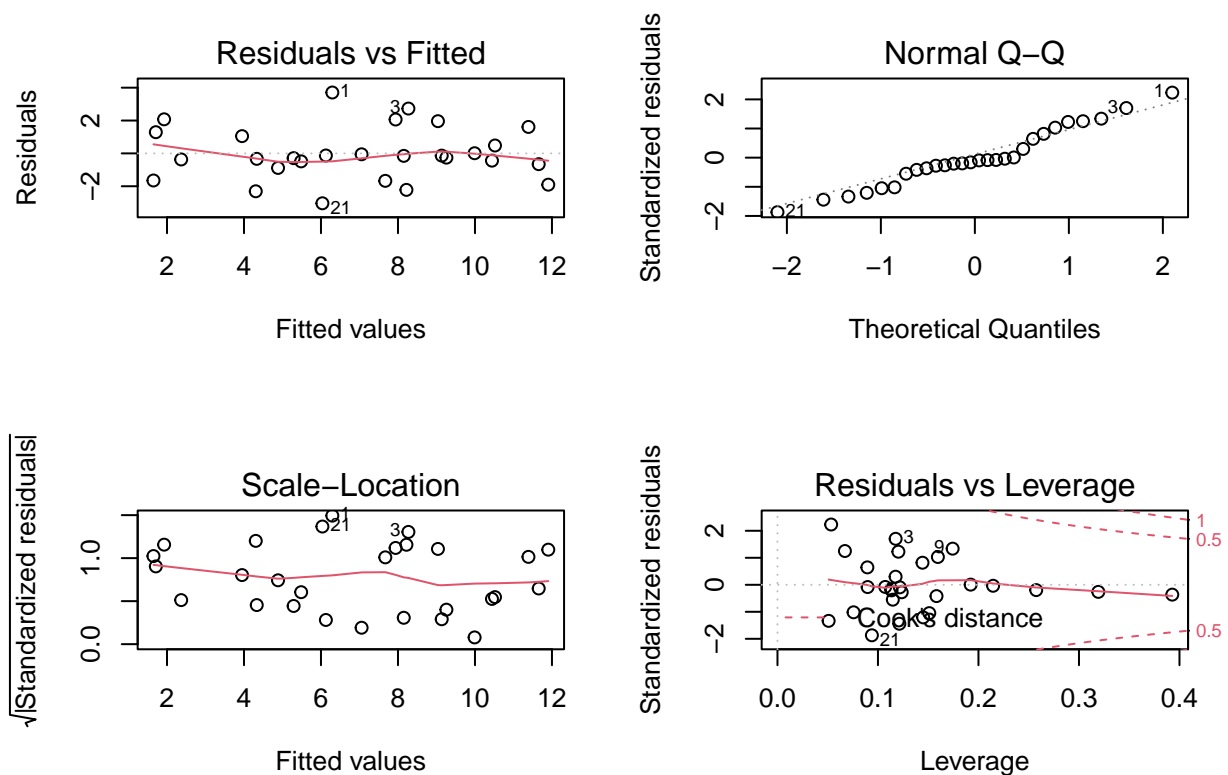


Guided Question Set 10 Solutions

1)

```
Data<-read.table("nfl.txt", header=TRUE)
result<-lm(y~x2+x7+x8, data=Data)

par(mfrow=c(2,2))
plot(result)
```



Based on the residual plot, the residuals are fairly evenly scattered on both sides of the horizontal axis with constant vertical spread. The regression assumptions appear to be met.

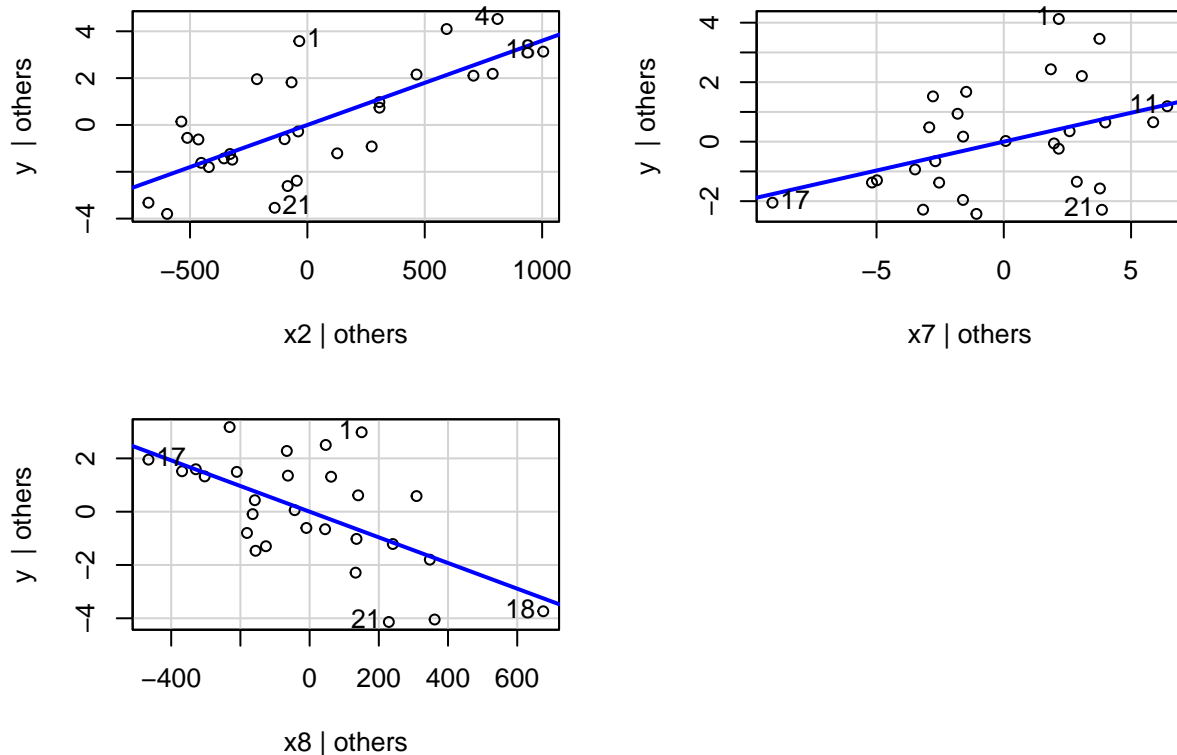
2)

```
library(car)
```

```
## Loading required package: carData
```

```
avPlots(result)
```

Added-Variable Plots



For all three partial regression plots, the plots are evenly scattered across the blue lines, indicating that we do not need to transform any of the predictors.

Note that this is consistent with what we saw from the residual plot. Since the residuals were evenly scattered across the horizontal axis, the assumption that the errors have mean 0 is met, so we should not need to transform any of the predictors.

3)

```
##externally studentized residuals
ext.student.res<-rstudent(result)
##identify
ext.student.res[abs(ext.student.res)>3]
```

```
## named numeric(0)
```

No outliers based on externally studentized residuals.

4)

```
##leverages
lev<-lm.influence(result)$hat
n<-dim(Data)[1]
p<-4
##identify
lev[lev>2*p/n]
```

```
##          18          27
## 0.3928394 0.3192801
```

Two teams that have high leverage, teams 18 and 27.

5)

```
DFFITS<-dffits(result)
DFFITS[abs(DFFITS)>2*sqrt(p/n)]
```

```
## named numeric(0)
```

There are no teams that are influential in terms of $DFFITs_i$.

```
DFBETAS<-dfbetas(result)
abs(DFBETAS)>2/sqrt(n)
```

```
##      (Intercept)      x2      x7      x8
## 1             FALSE FALSE FALSE FALSE
## 2             FALSE FALSE FALSE FALSE
## 3             FALSE FALSE FALSE FALSE
## 4             FALSE FALSE FALSE FALSE
## 5             FALSE FALSE FALSE FALSE
## 6             FALSE FALSE FALSE FALSE
## 7             FALSE FALSE FALSE FALSE
## 8             FALSE FALSE FALSE FALSE
## 9             FALSE FALSE FALSE FALSE
## 10            FALSE FALSE FALSE  TRUE
## 11            FALSE FALSE FALSE FALSE
## 12            FALSE FALSE FALSE FALSE
## 13            FALSE FALSE FALSE FALSE
## 14            FALSE FALSE FALSE FALSE
```

```
## 15      FALSE FALSE FALSE FALSE
## 16      FALSE FALSE FALSE FALSE
## 17      FALSE FALSE FALSE FALSE
## 18      FALSE FALSE FALSE FALSE
## 19      FALSE FALSE FALSE FALSE
## 20      FALSE FALSE FALSE FALSE
## 21      FALSE FALSE  TRUE FALSE
## 22      FALSE FALSE FALSE FALSE
## 23      FALSE FALSE FALSE FALSE
## 24      FALSE FALSE FALSE FALSE
## 25      FALSE FALSE FALSE FALSE
## 26      FALSE FALSE FALSE FALSE
## 27      FALSE FALSE FALSE FALSE
## 28      FALSE FALSE FALSE FALSE
```

Team 21 is influential in terms of β_3 and team 10 is influential in terms of β_4 .

```
COOKS<-cooks.distance(result)
COOKS[COOKS>1]
```

```
## named numeric(0)
```

There are no teams that are influential in terms of Cook's distance.