T1-E02-REG8.R

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Thu Oct 11 17:44:17 2018

```
setwd("~/Documents/CURS 2018-2019/PIE2")
dd<-read.csv2("./Dades/REG8.csv")
p<-2
library(car)
```

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

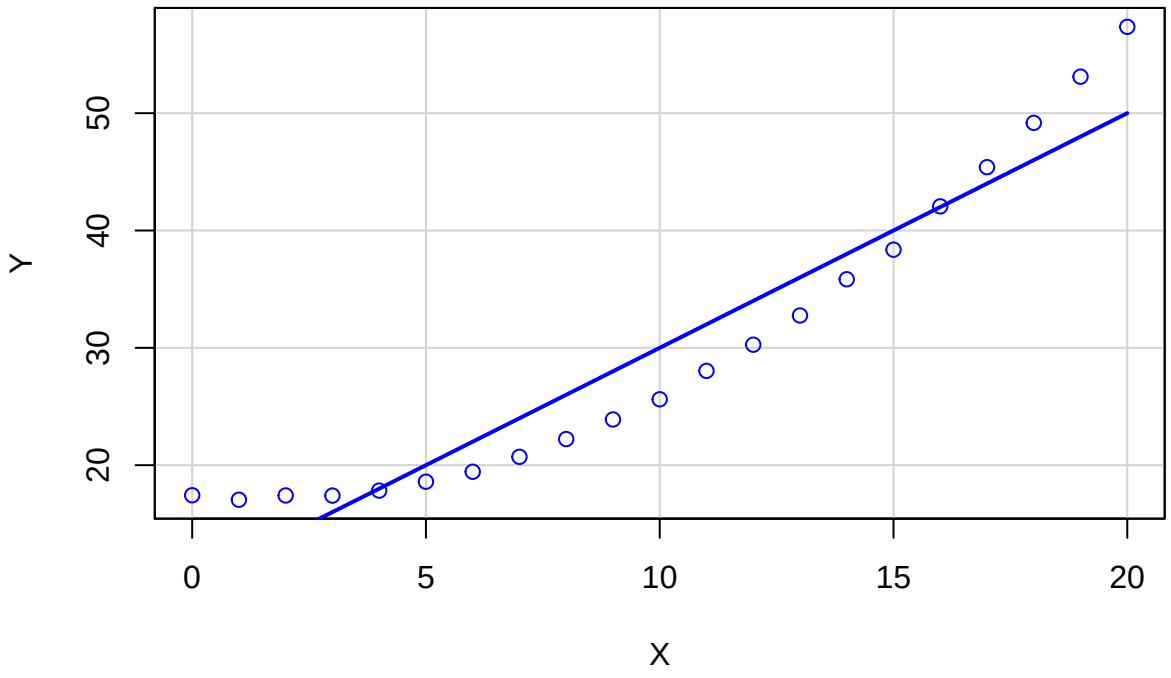
```
library(HH)
```

```
## Loading required package: lattice
## Loading required package: grid
## Loading required package: latticeExtra
## Loading required package: RColorBrewer
## Loading required package: multcomp
## Loading required package: mvtnorm
## Loading required package: survival
## Warning: package 'survival' was built under R version 3.4.4
## Loading required package: TH.data
## Loading required package: MASS
##
## Attaching package: 'TH.data'
## The following object is masked from 'package:MASS':
##
##     geyser
## Loading required package: gridExtra
##
## Attaching package: 'HH'
## The following objects are masked from 'package:car':
##
##     logit, vif
```

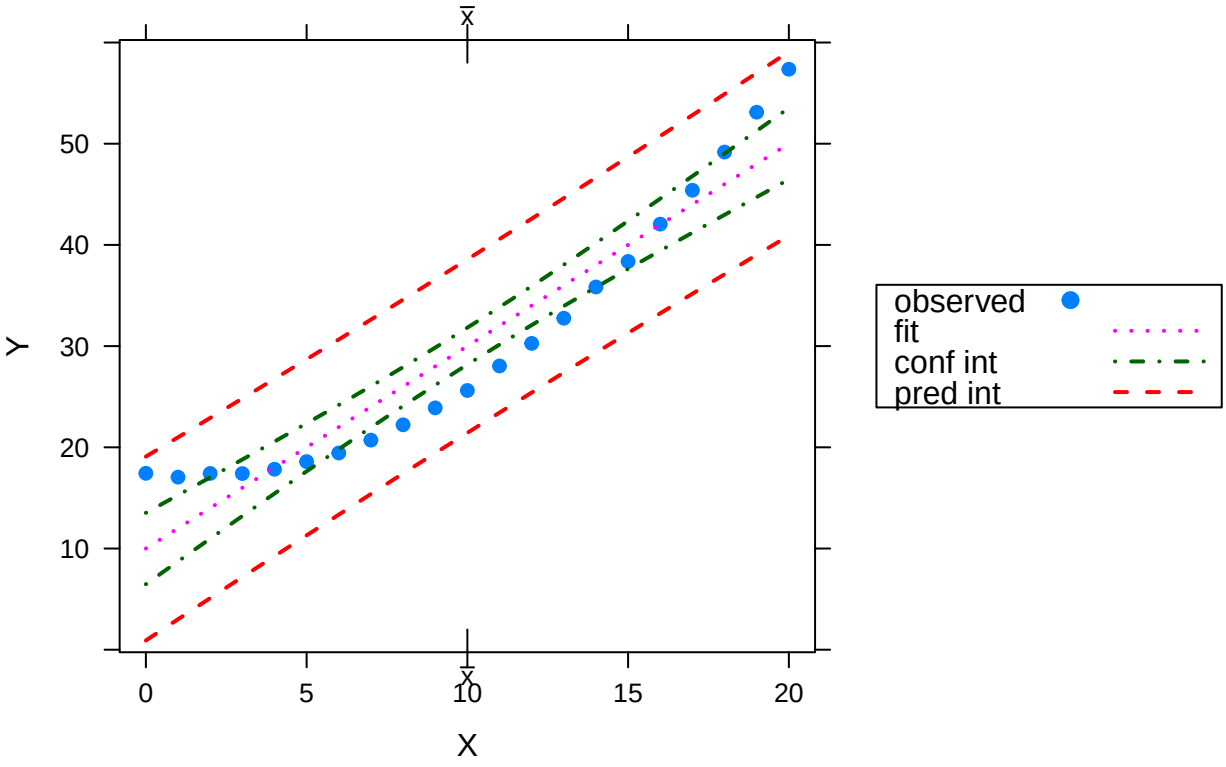
```
for (reg in 1:8){
  write("=================================================================","")
  write(paste("Reg",reg),"")

  Y<-dd[dd$REG==reg,"Y"]
  X<-dd[dd$REG==reg,"X"]
  n<-length(X)

  # Descriptiva
```

```
  scatterplot(X,Y,smooth=F,boxplots = F)

  write("_____________________________________________________________________","")
  write("a), b) & c)","")

  m<-lm(Y~X)
  plot(ci.plot(m))
  print(summary(m))

  write("_____________________________________________________________________","")
  write("d)","")

  oldpar <- par(mfrow=c(1,2))
   plot(X,resid(m))  #o rstudent(m) , h=c(-2,0,2)
   abline(h=0,lty=2)
   plot(X,dffits(m))
   abline(h=c(-2*sqrt(p/n),0,2*sqrt(p/n)),lty=2)
   plot(m,ask=F)
  par(oldpar)
}
```

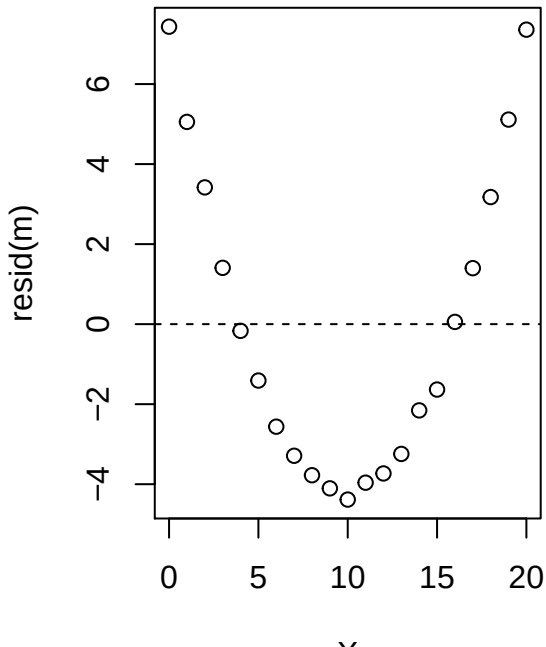
```
## ======================================================================
## Reg 1
```

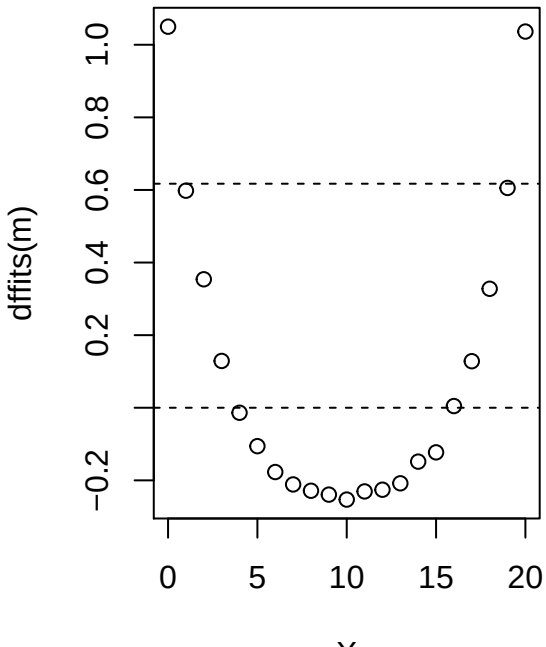


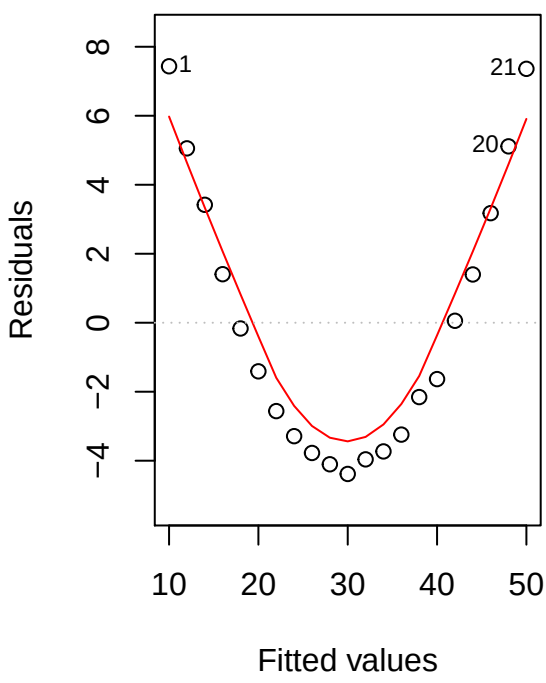

```
## _____________________________________________________________
## a), b) & c)
```

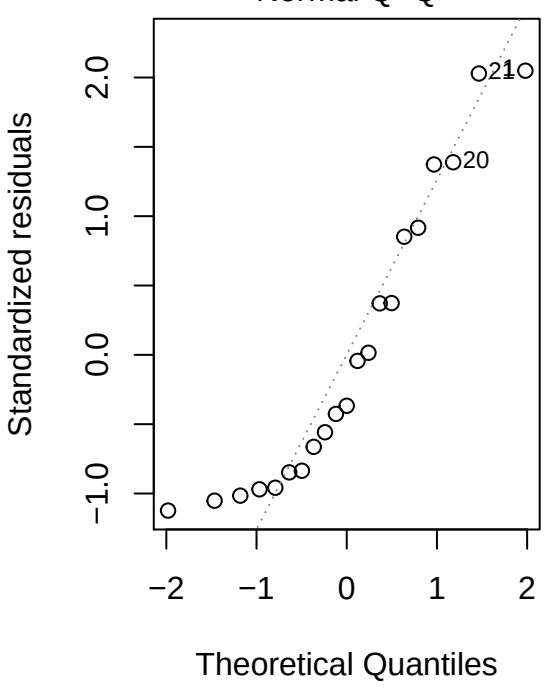


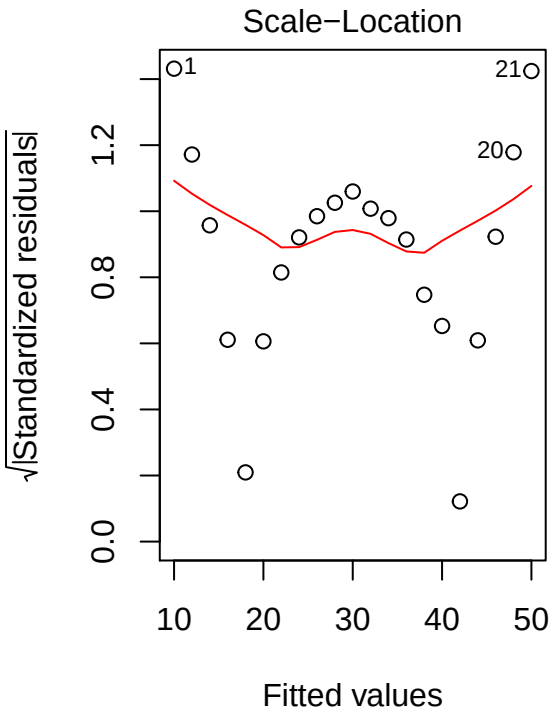

```
##
## Call:
## lm(formula = Y ~ X)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -4.384 -3.289 -1.409  3.176  7.434
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  10.0000     1.6852   5.934 1.03e-05 ***
## X             2.0000     0.1441  13.874 2.15e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4 on 19 degrees of freedom
## Multiple R-squared:  0.9102, Adjusted R-squared:  0.9054
## F-statistic: 192.5 on 1 and 19 DF,  p-value: 2.153e-11
##
## ------------------------------------------------------------------
## d)
```

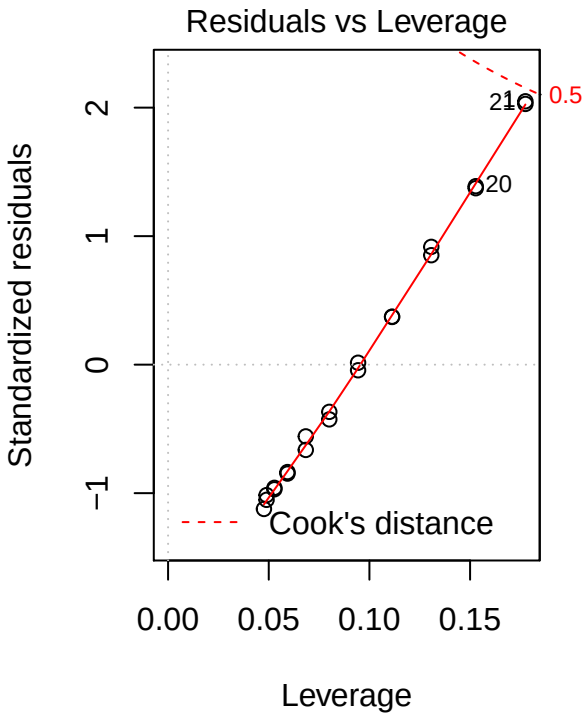

resid(m)
X


dffits(m)
X

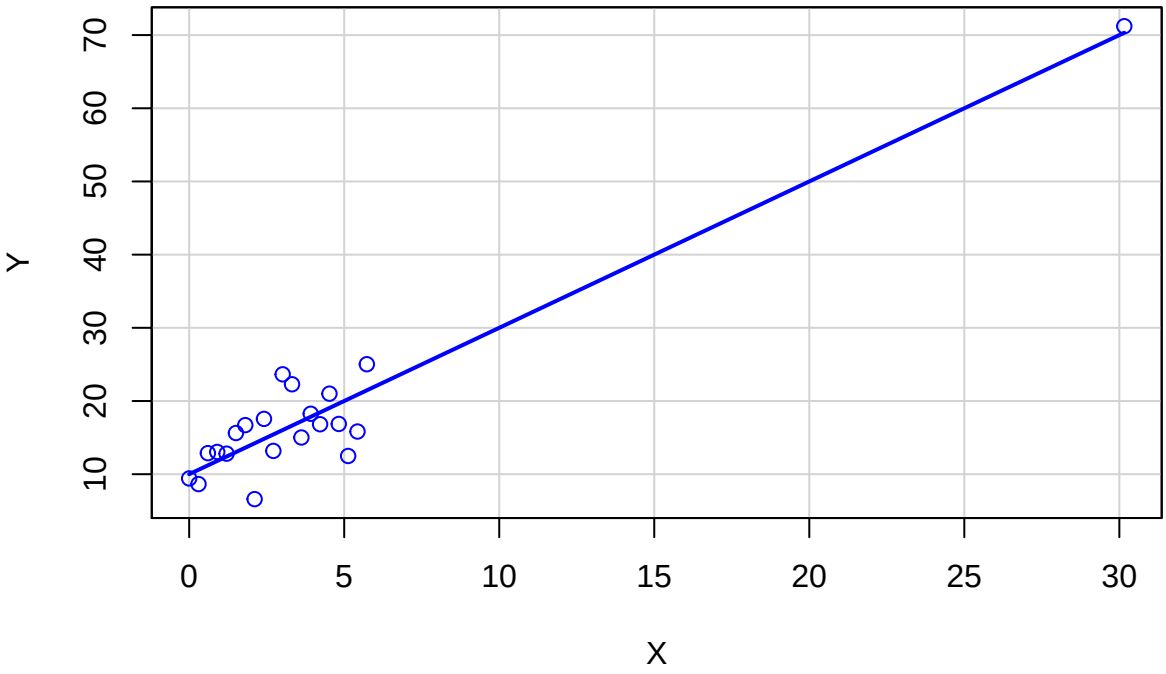

Residuals vs Fitted
Residuals
Fitted values
1
21
20


Normal Q−Q
Standardized residuals
Theoretical Quantiles
21
20

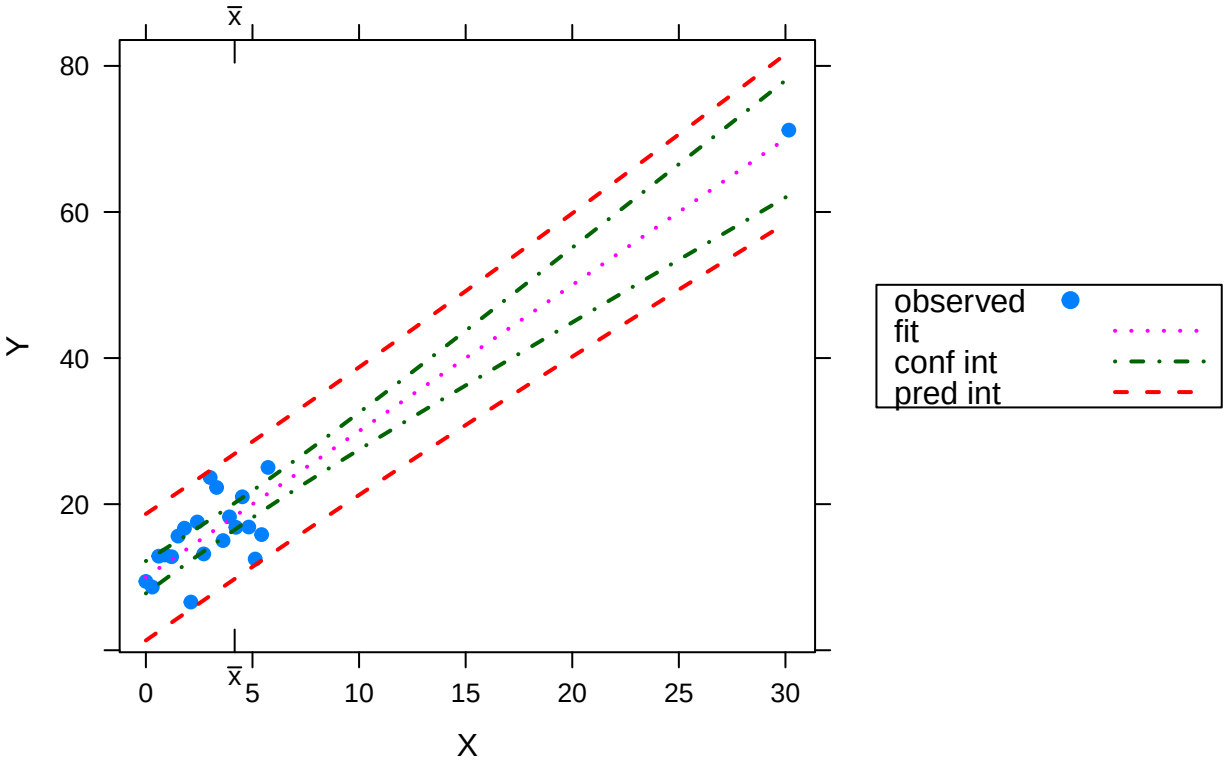

Scale−Location
√|Standardized residuals|
Fitted values
1
21
20
0.0
0.4
0.8
1.2
10
20
30
40
50


Residuals vs Leverage
Standardized residuals
Leverage
Cook's distance
0.5
21
20
−1
0
1
2
0.00
0.05
0.10
0.15

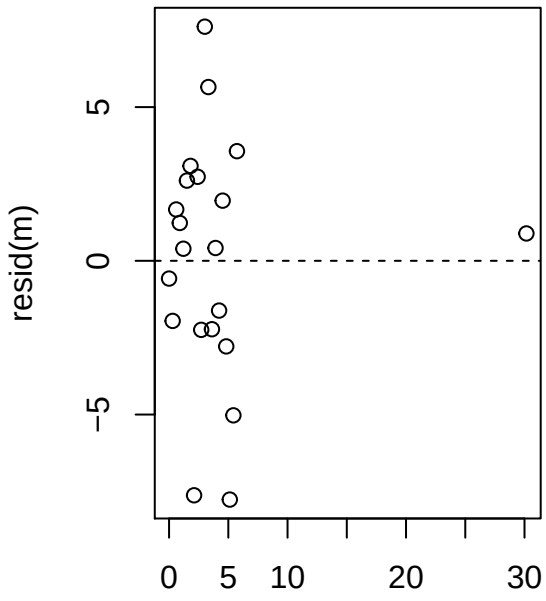
```
## ================================================================
## Reg 2
```

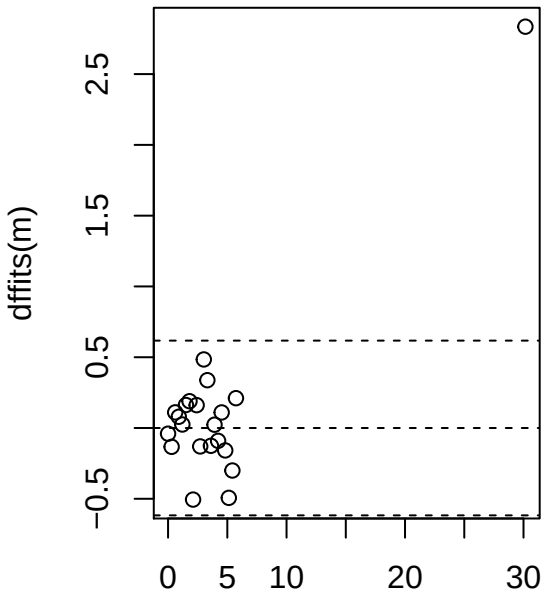

Y
X
10
20
30
40
50
60
70
0
5
10
15
20
25
30

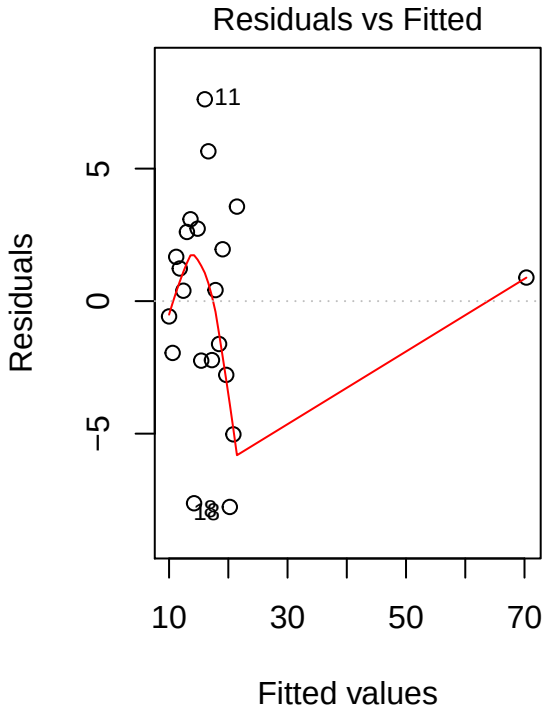
```
## ----------------------------------------------------------------
## a), b) & c)
```

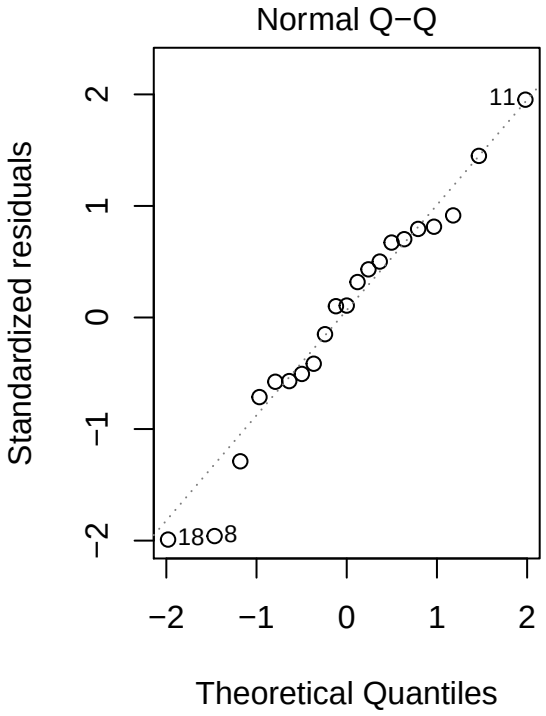


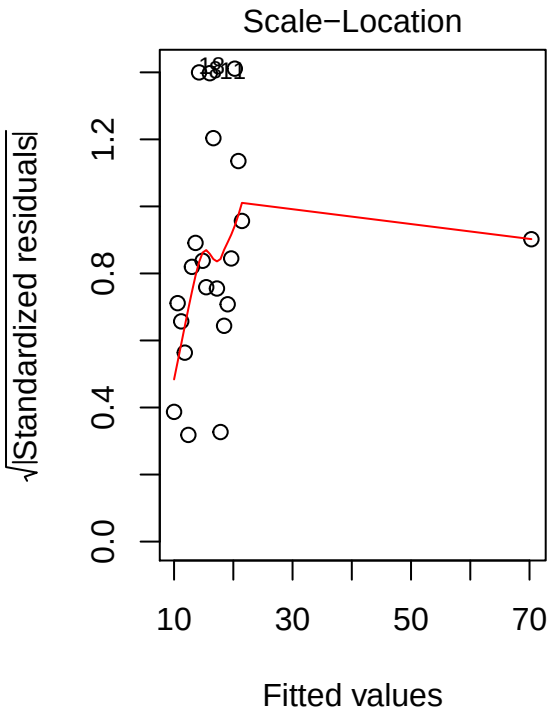

```
##
## Call:
## lm(formula = Y ~ X)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -7.7659 -2.2250  0.4169  2.6096  7.6157
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  10.0000     1.0594   9.439 1.32e-08 ***
## X             2.0000     0.1441  13.874 2.15e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4 on 19 degrees of freedom
## Multiple R-squared:  0.9102, Adjusted R-squared:  0.9054
## F-statistic: 192.5 on 1 and 19 DF,  p-value: 2.153e-11
##
## ------------------------------------------------------------------
## d)
```

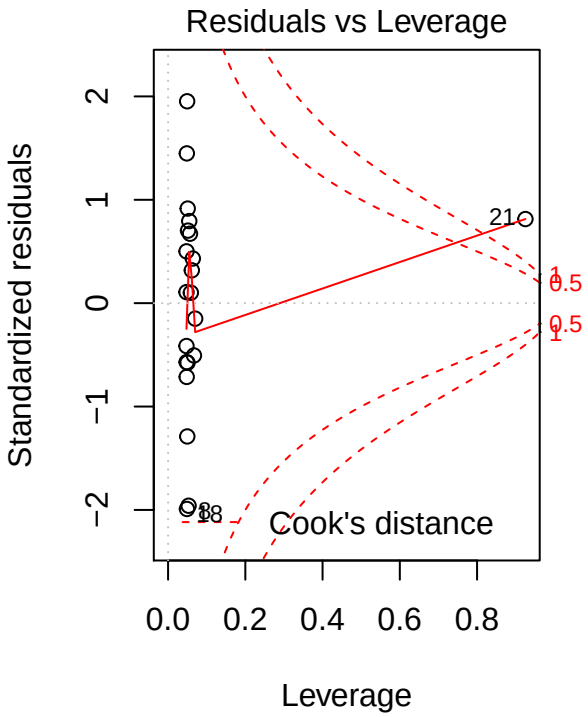

resid(m)
5
0
−5
0
5
10
20
30
X


dffits(m)
2.5
1.5
0.5
−0.5
0
5
10
20
30
X

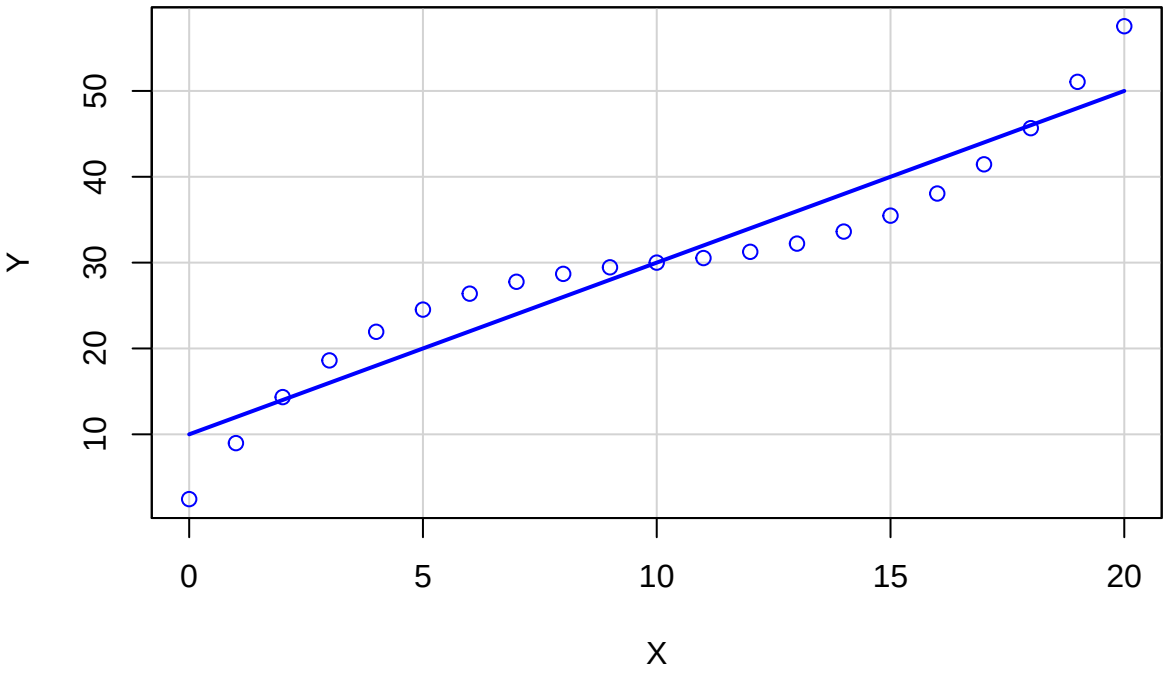

Residuals vs Fitted
Residuals
5
0
−5
11
18
10
30
50
70
Fitted values


Normal Q−Q
Standardized residuals
2
1
0
−1
−2
11
18
8
−2
−1
0
1
2
Theoretical Quantiles

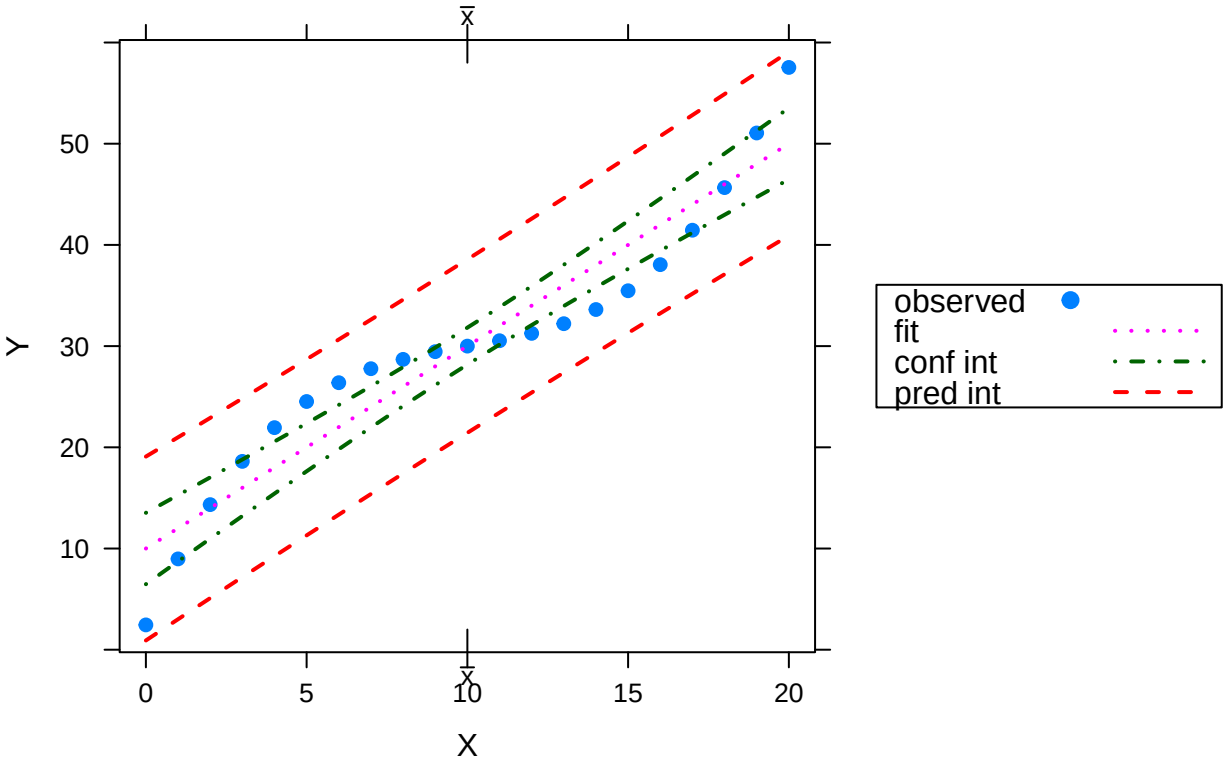

Scale−Location
√|Standardized residuals|
0.0
0.4
0.8
1.2
10
30
50
70
Fitted values


Residuals vs Leverage
Standardized residuals
−2
−1
0
1
2
21
0.5
0.5
1
1
Cook's distance
0.0
0.2
0.4
0.6
0.8
Leverage

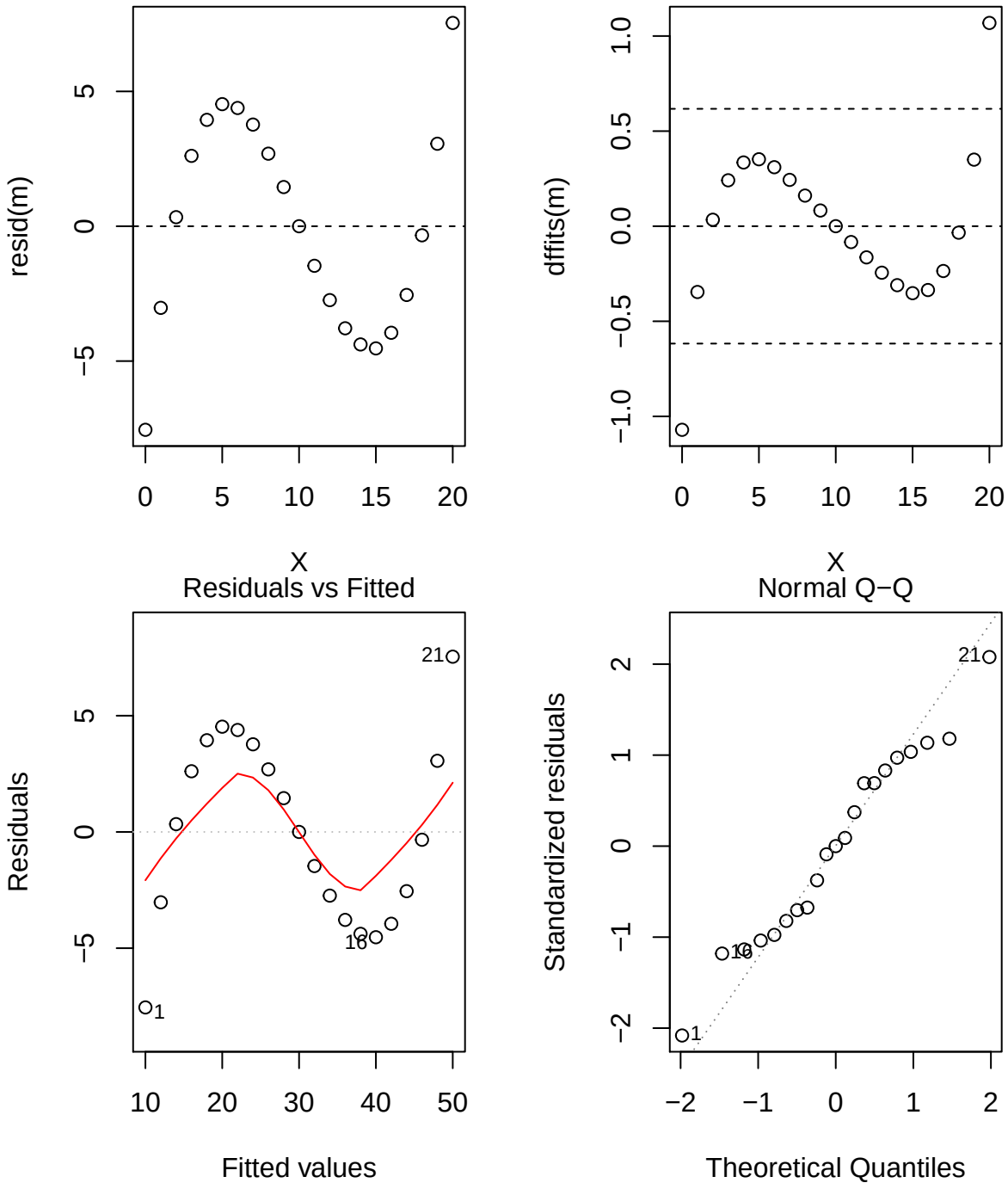
```
## ================================================================
## Reg 3
```

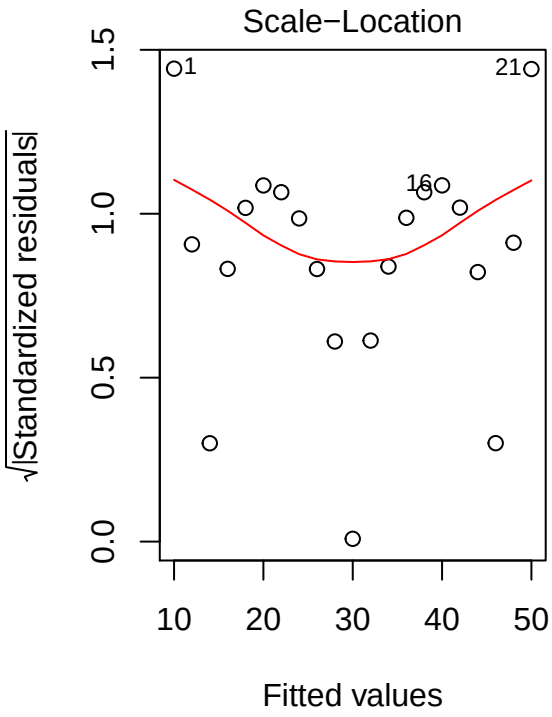

Y
10
20
30
40
50
0
5
10
15
20
X

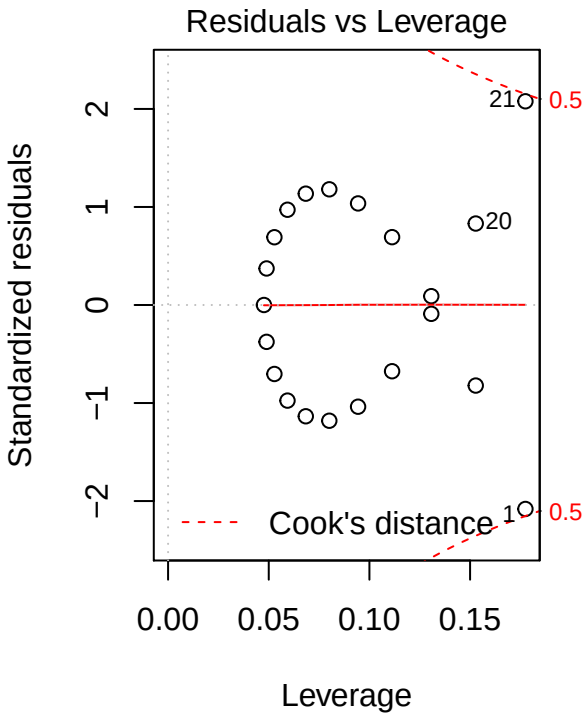
```
## ----------------------------------------------------------------
## a), b) & c)
```



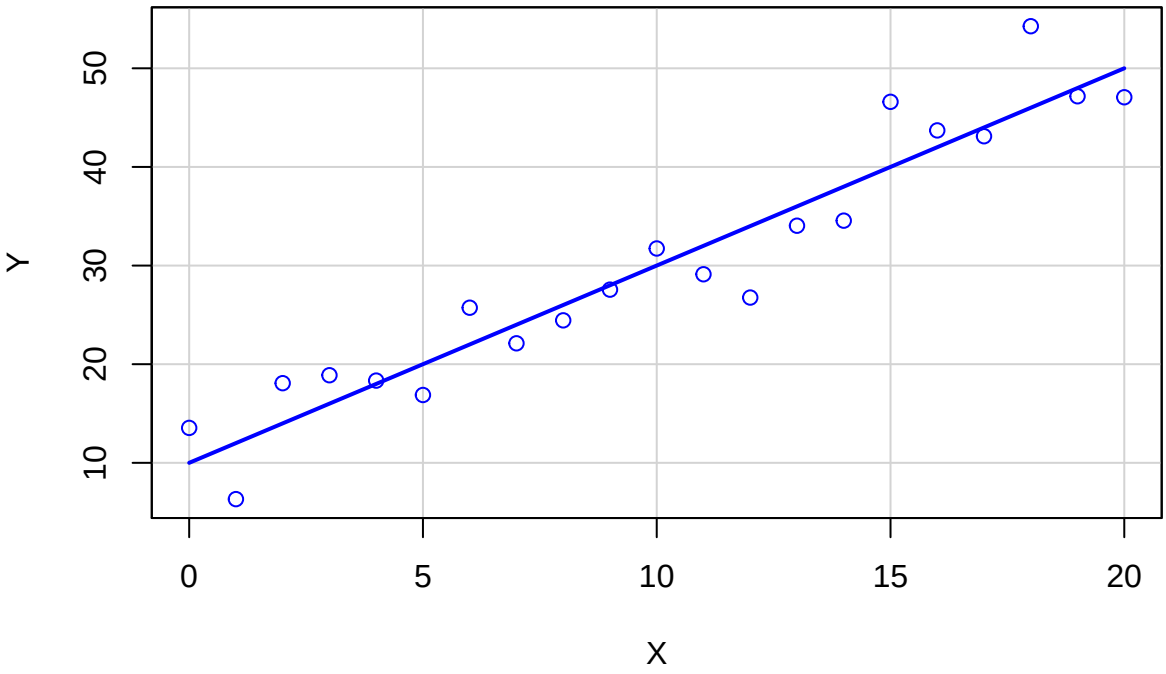

```
##
## Call:
## lm(formula = Y ~ X)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -7.5485 -3.0263 -0.0003  3.0596  7.5382
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  10.0000     1.6852   5.934 1.03e-05 ***
## X             2.0000     0.1441  13.874 2.15e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4 on 19 degrees of freedom
## Multiple R-squared:  0.9102, Adjusted R-squared:  0.9054
## F-statistic: 192.5 on 1 and 19 DF,  p-value: 2.153e-11
##
## ------------------------------------------------------------------
## d)
```


resid(m)
X
dffits(m)
X
Residuals vs Fitted
Residuals
Fitted values
21
16
1
Normal Q−Q
Standardized residuals
Theoretical Quantiles
21
10
1

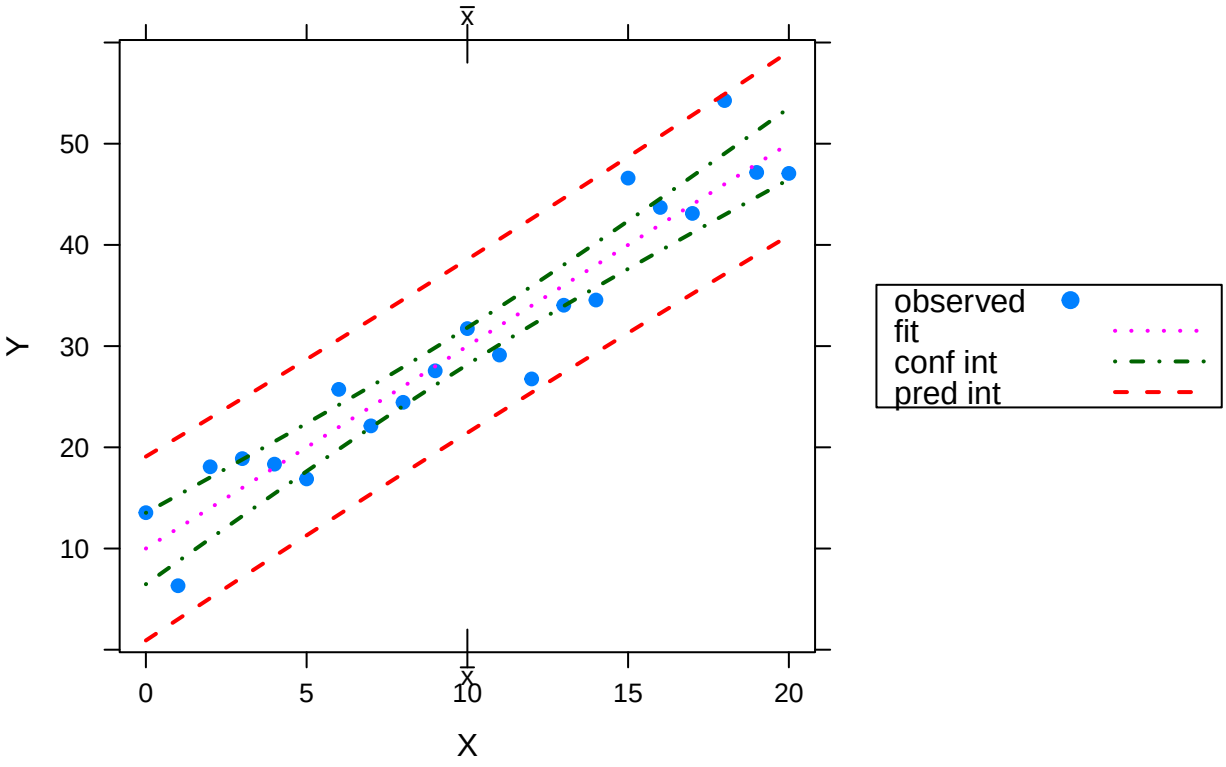

Scale−Location
√|Standardized residuals|
Fitted values
1
21
16
0.0
0.5
1.0
1.5
10
20
30
40
50


Residuals vs Leverage
Standardized residuals
Leverage
Cook's distance
21
20
1
0.5
0.5
−2
−1
0
1
2
0.00
0.05
0.10
0.15

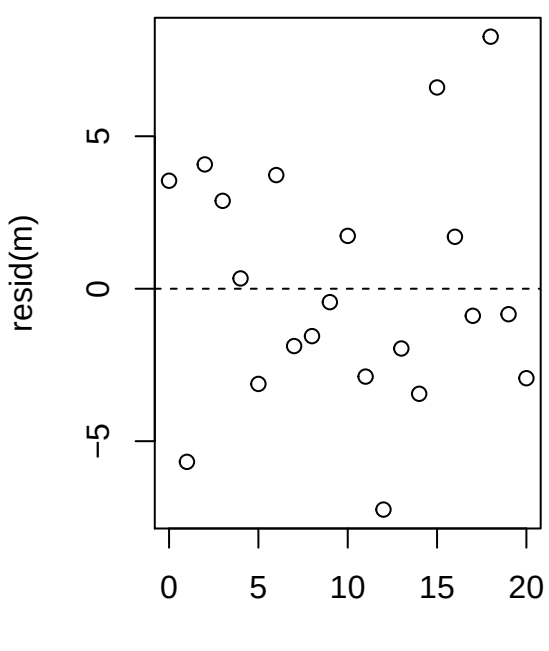
```
## ================================================================
## Reg 4
```

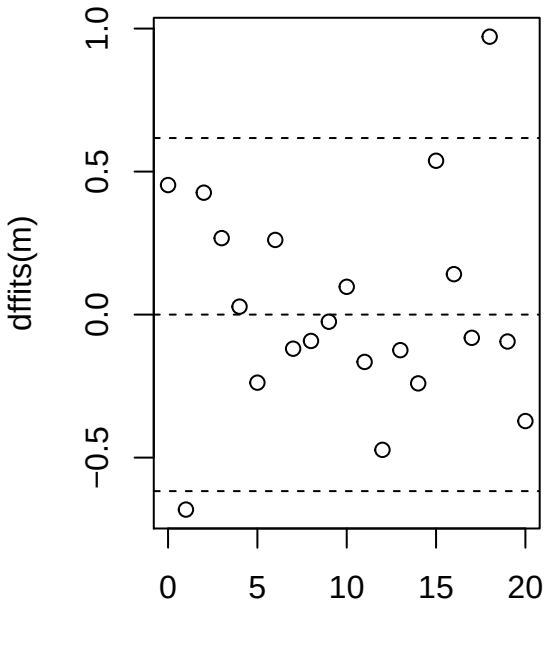

Y
X
10
20
30
40
50
0
5
10
15
20

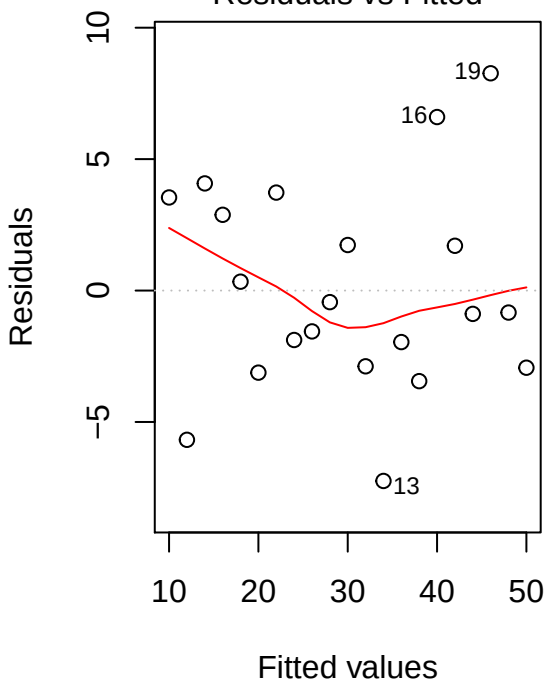
```
## ----------------------------------------------------------------
## a), b) & c)
```

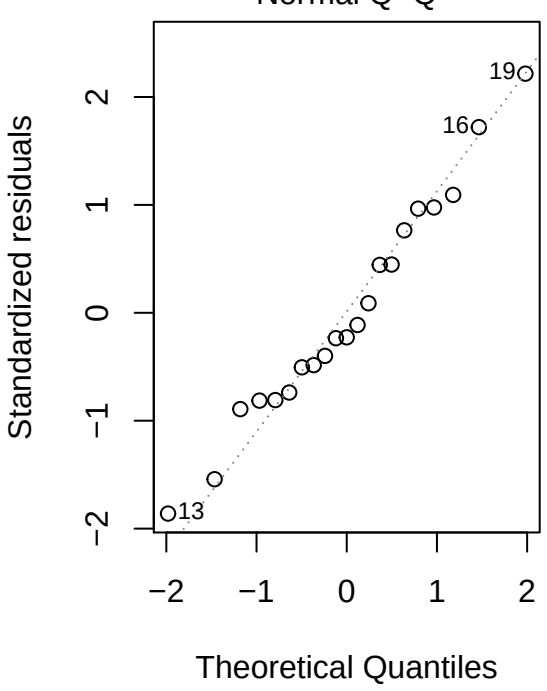


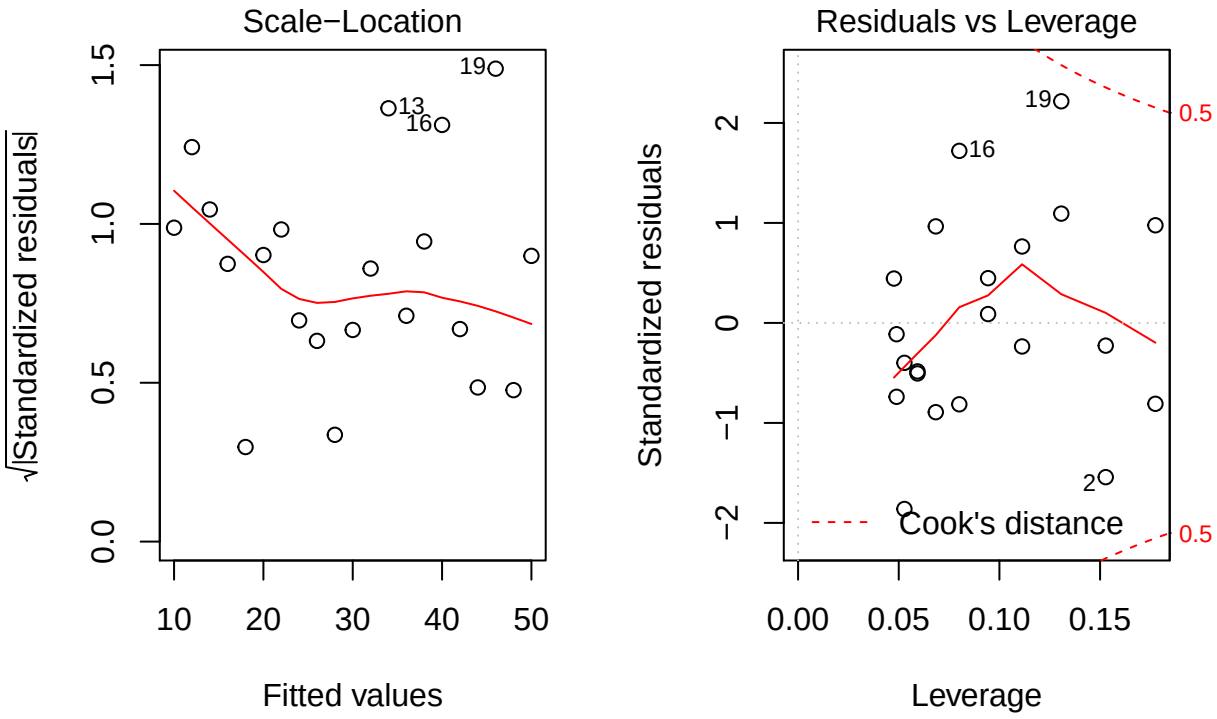

```
##
## Call:
## lm(formula = Y ~ X)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -7.2433 -2.8824 -0.8368  2.8820  8.2657
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  10.0000     1.6852   5.934 1.03e-05 ***
## X             2.0000     0.1441  13.874 2.15e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4 on 19 degrees of freedom
## Multiple R-squared:  0.9102, Adjusted R-squared:  0.9054
## F-statistic: 192.5 on 1 and 19 DF,  p-value: 2.153e-11
##
## ------------------------------------------------------------------
## d)
```


resid(m)
5
0
−5
0
5
10
15
20
X

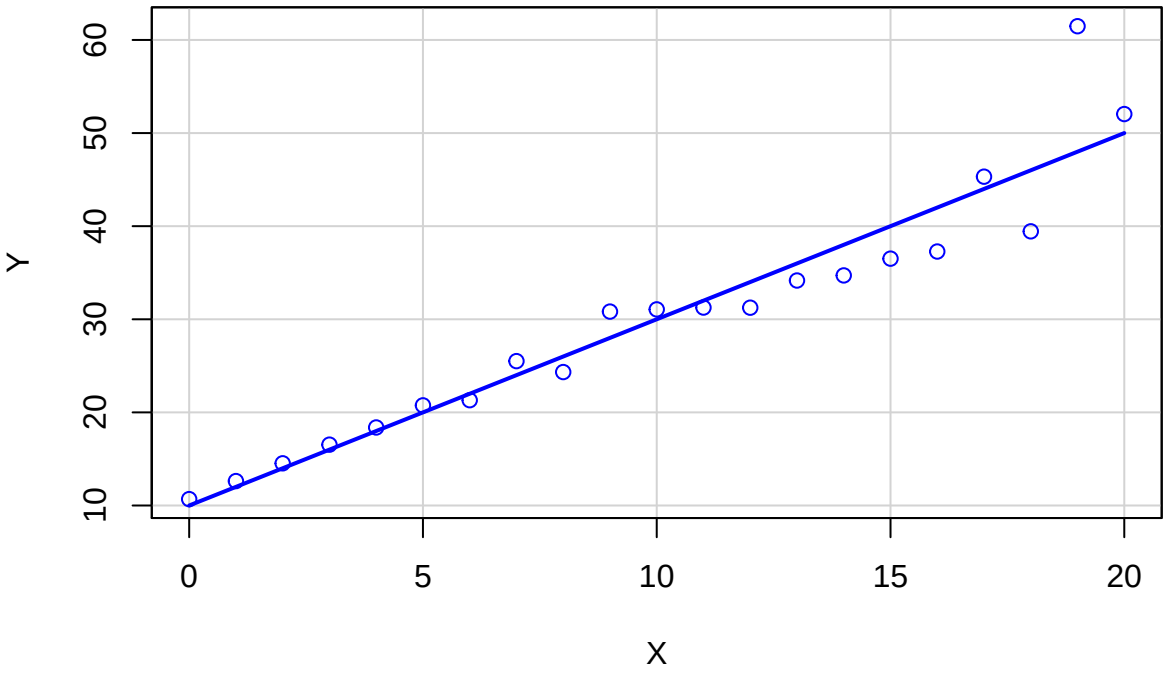

dffits(m)
1.0
0.5
0.0
−0.5
0
5
10
15
20
X


Residuals vs Fitted
Residuals
10
5
0
−5
19
16
13
10
20
30
40
50
Fitted values

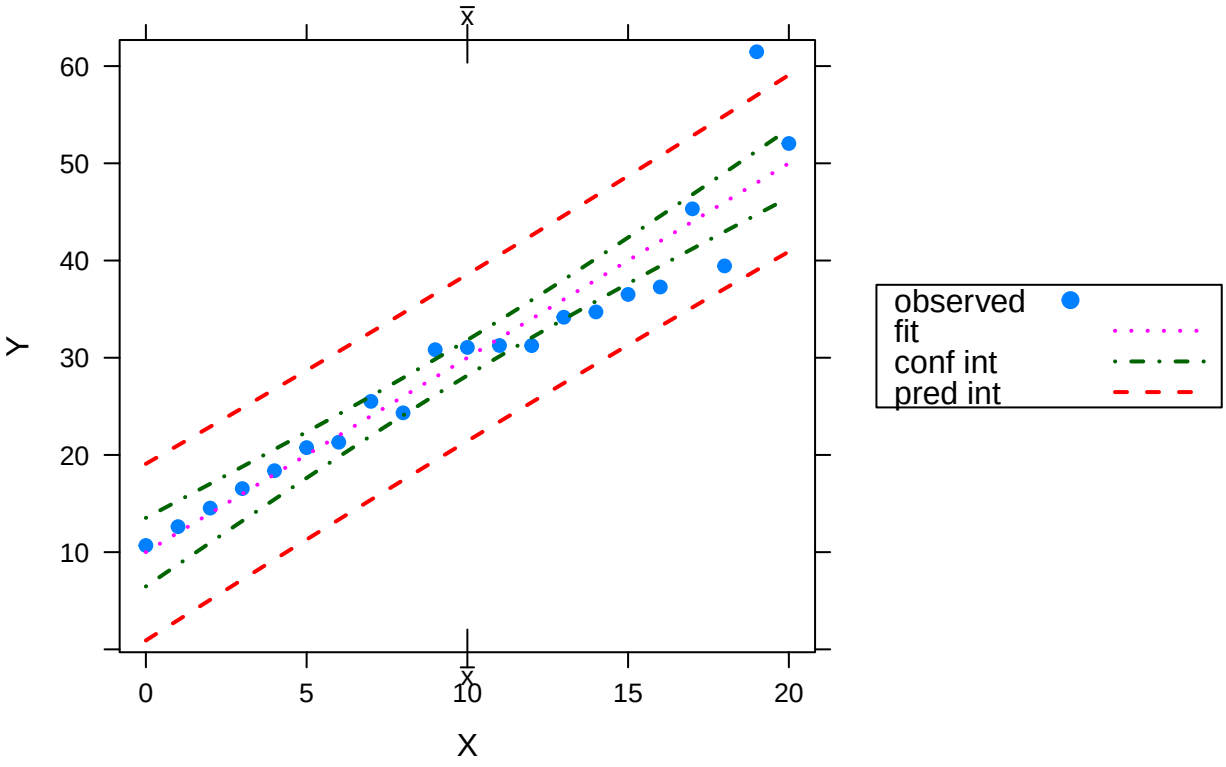

Normal Q−Q
Standardized residuals
2
1
0
−1
−2
19
16
13
−2
−1
0
1
2
Theoretical Quantiles


Scale−Location
√|Standardized residuals|
Fitted values
19
13
16
Residuals vs Leverage
Standardized residuals
Leverage
Cook's distance
0.5
0.5
19
16
2

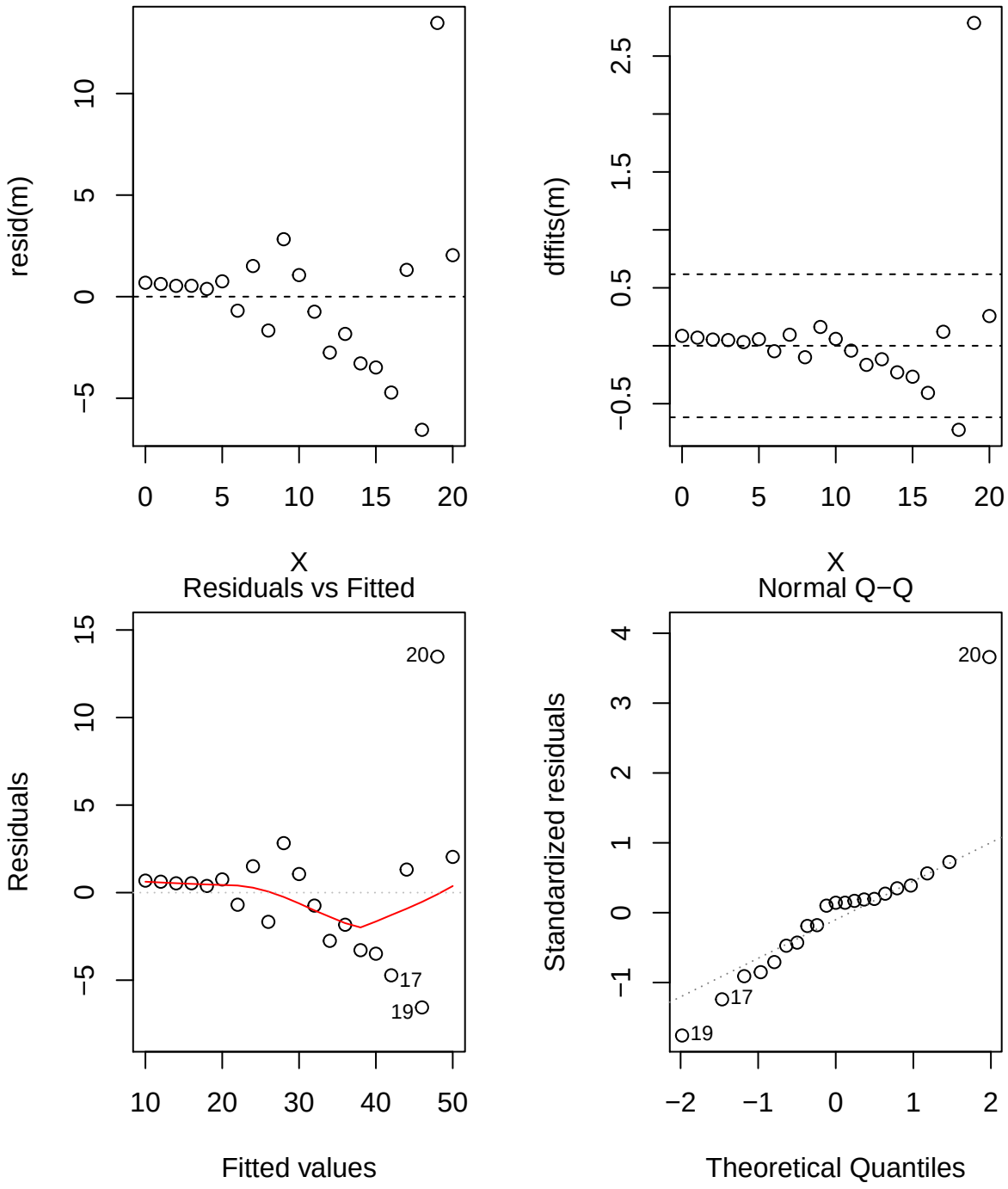
```
## ================================================================
## Reg 5
```

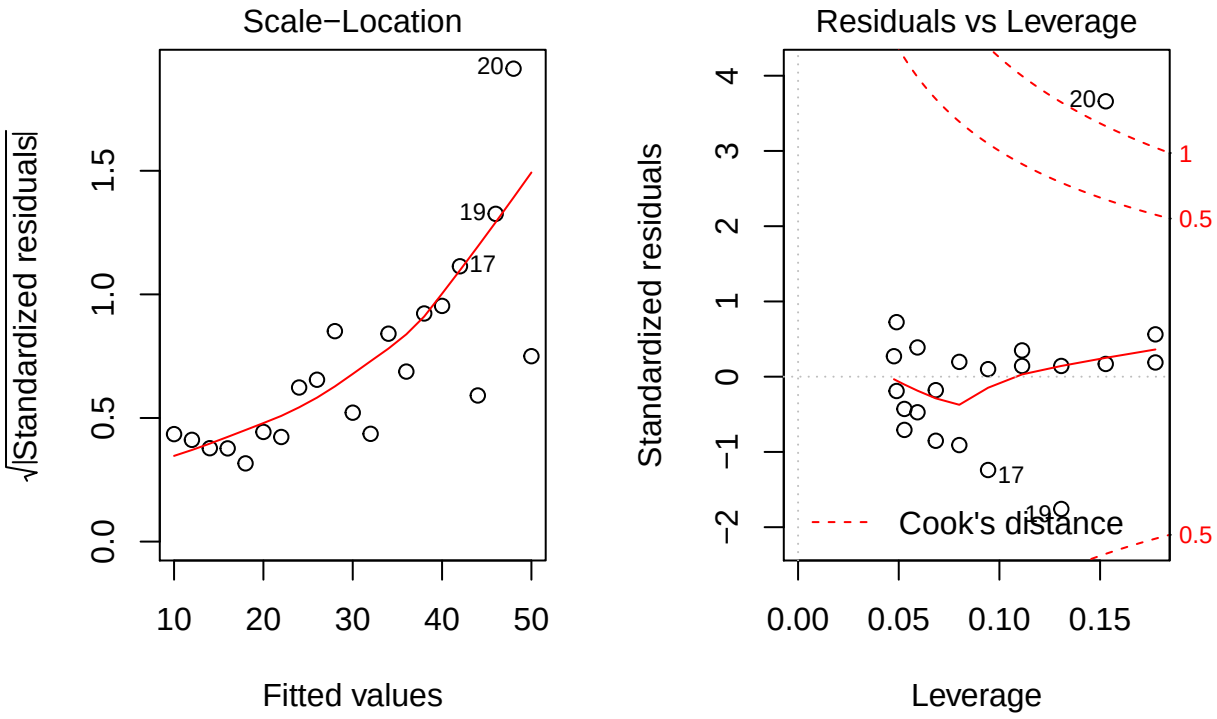

Y
X

```
## ----------------------------------------------------------------
## a), b) & c)
```

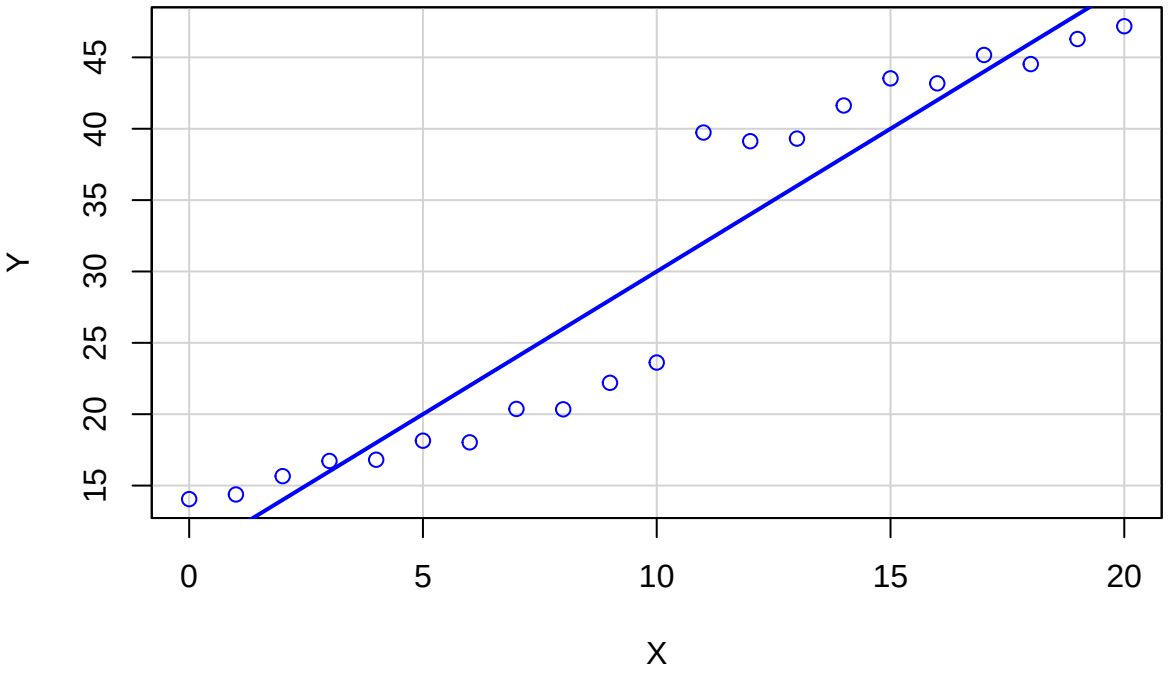



```
##
## Call:
## lm(formula = Y ~ X)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -6.5558 -1.8347  0.5321  1.0613 13.4747
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  10.0000     1.6852   5.934 1.03e-05 ***
## X             2.0000     0.1441  13.874 2.15e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4 on 19 degrees of freedom
## Multiple R-squared:  0.9102, Adjusted R-squared:  0.9054
## F-statistic: 192.5 on 1 and 19 DF,  p-value: 2.153e-11
##
## ------------------------------------------------------------------
## d)
```

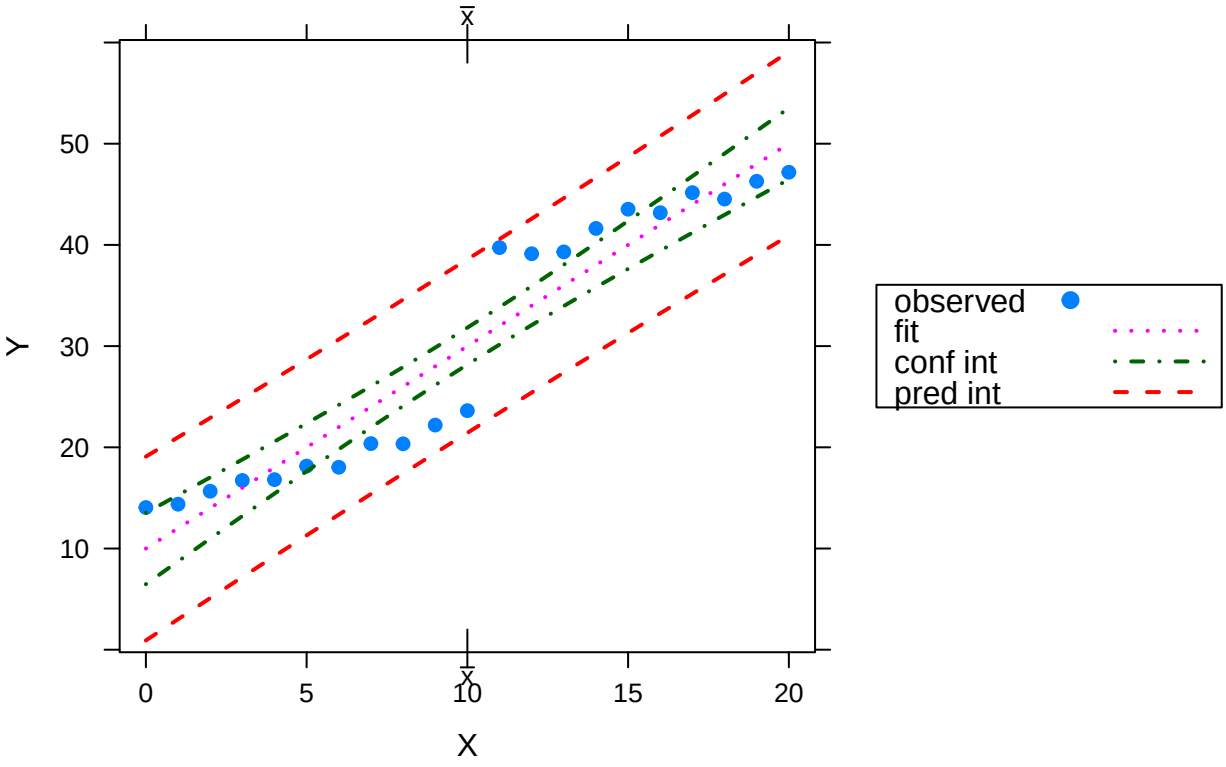

resid(m)
X
dffits(m)
X
Residuals vs Fitted
Residuals
Fitted values
Normal Q−Q
Standardized residuals
Theoretical Quantiles
20
17
19


Scale−Location
√|Standardized residuals|
Fitted values
20
19
17
Residuals vs Leverage
Standardized residuals
Leverage
Cook's distance
1
0.5
0.5

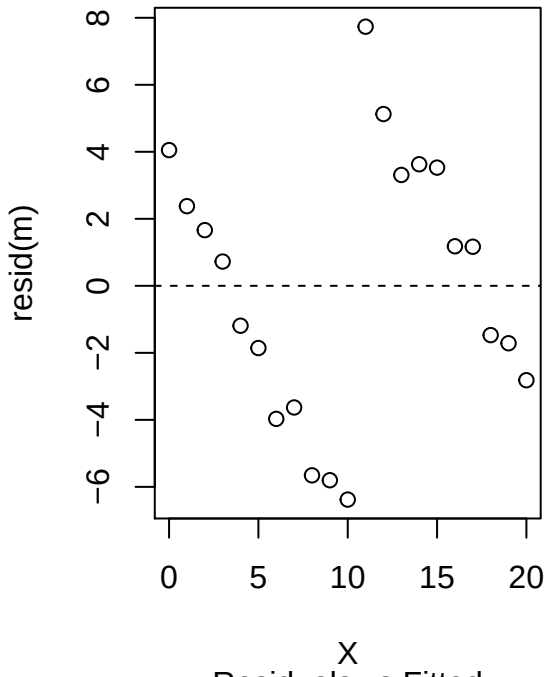
```
## ================================================================
## Reg 6
```

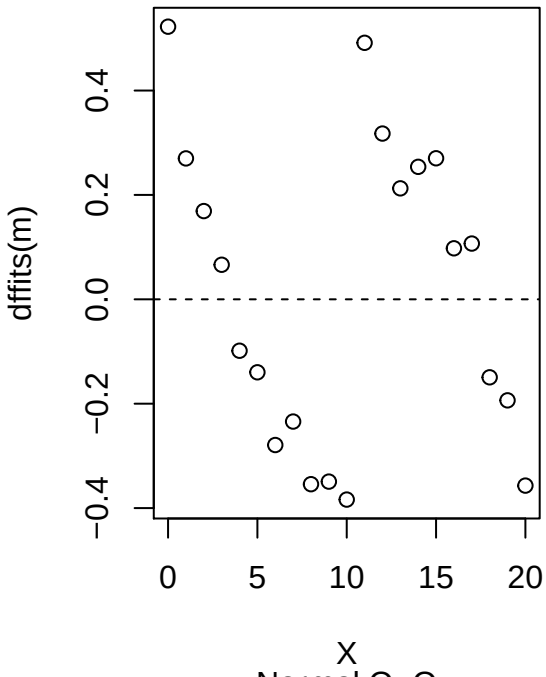

Y
X

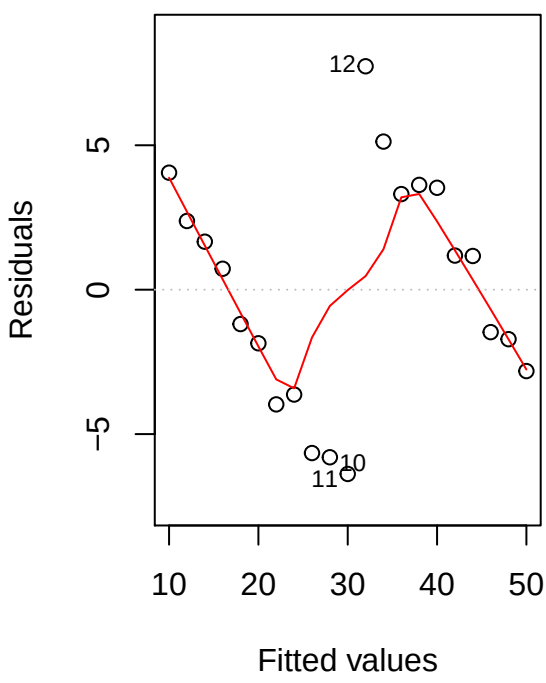
```
## ----------------------------------------------------------------
## a), b) & c)
```

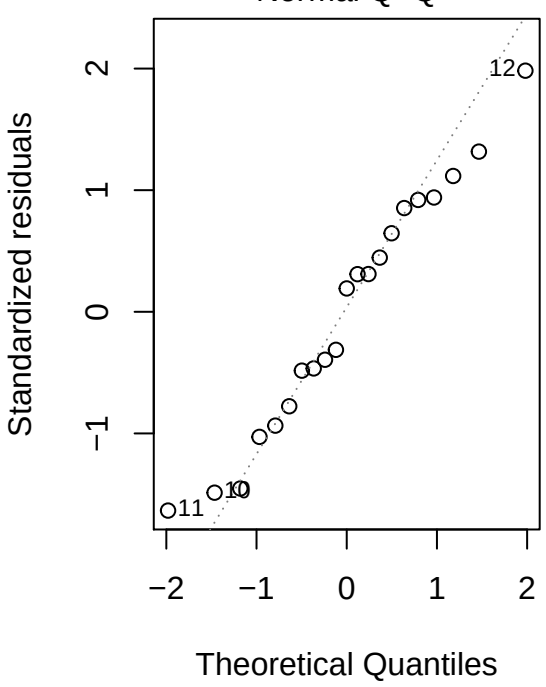


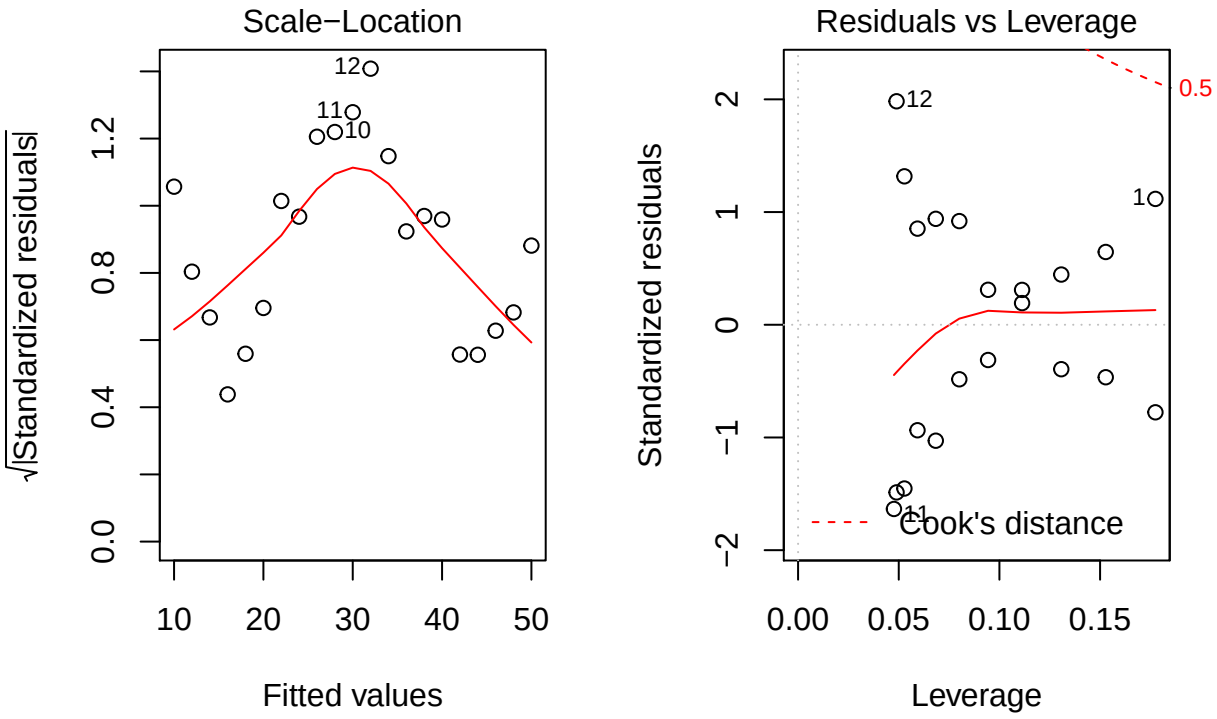

```
##
## Call:
## lm(formula = Y ~ X)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -6.3797 -2.8178  0.7244  3.3092  7.7345
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  10.0000     1.6852   5.934 1.03e-05 ***
## X             2.0000     0.1441  13.874 2.15e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4 on 19 degrees of freedom
## Multiple R-squared:  0.9102, Adjusted R-squared:  0.9054
## F-statistic: 192.5 on 1 and 19 DF,  p-value: 2.153e-11
##
## ------------------------------------------------------------------
## d)
```


resid(m)
X

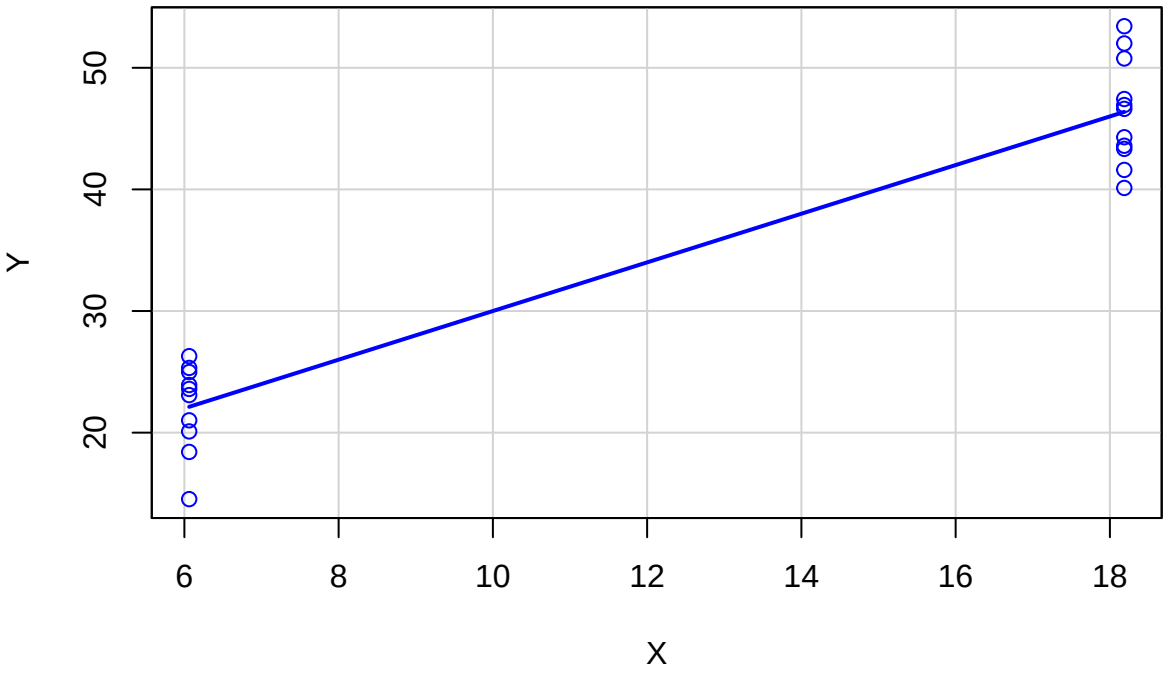

dffits(m)
X


Residuals vs Fitted
Residuals
Fitted values

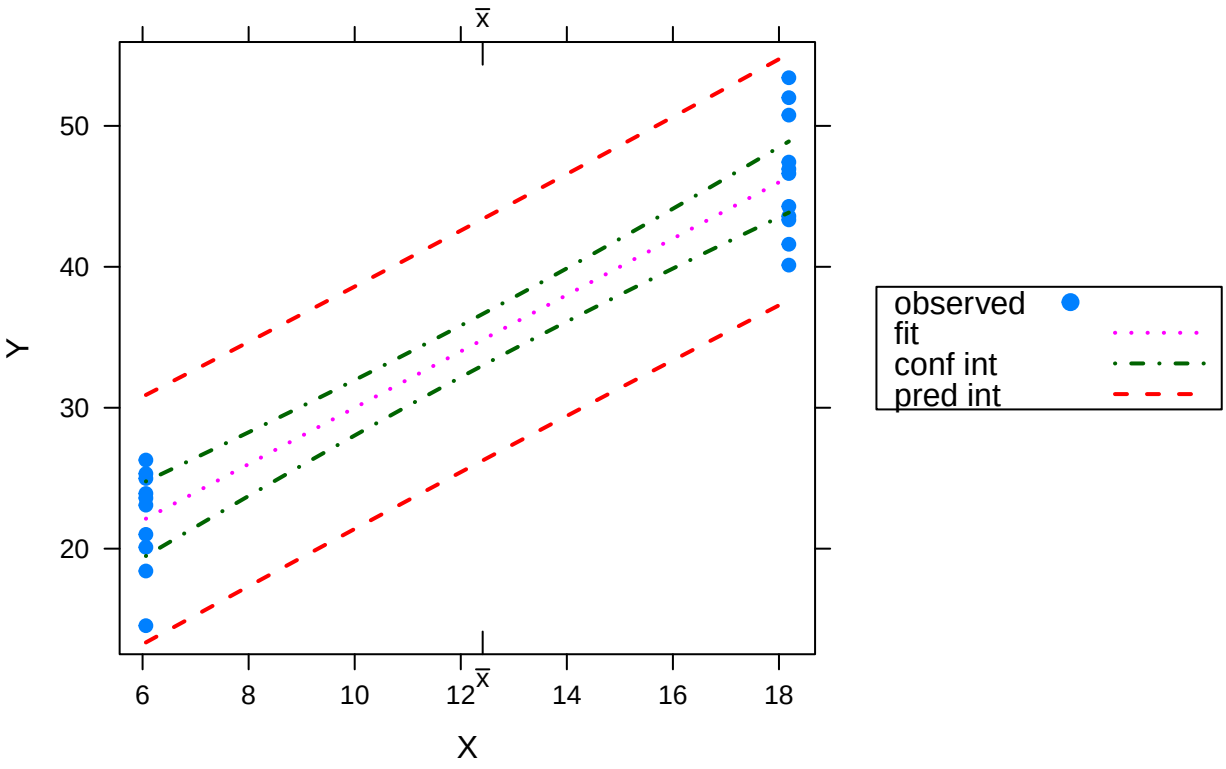

Normal Q−Q
Standardized residuals
Theoretical Quantiles


Scale−Location
√|Standardized residuals|
Fitted values
12
11
10
0.0
0.4
0.8
1.2
10
20
30
40
50
Residuals vs Leverage
Standardized residuals
Leverage
Cook's distance
0.5
12
1
11
−2
−1
0
1
2
0.00
0.05
0.10
0.15

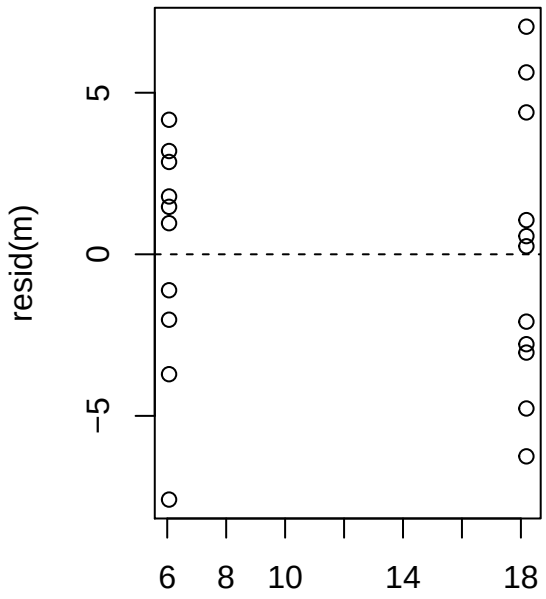
```
## ================================================================
## Reg 7
```

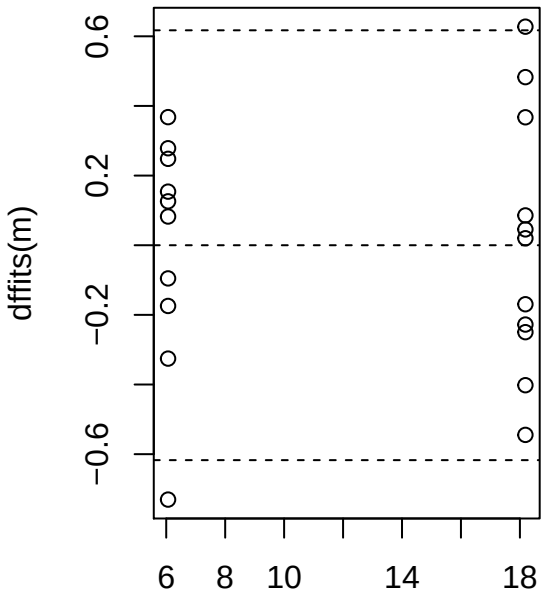

Y
X
20
30
40
50
6
8
10
12
14
16
18

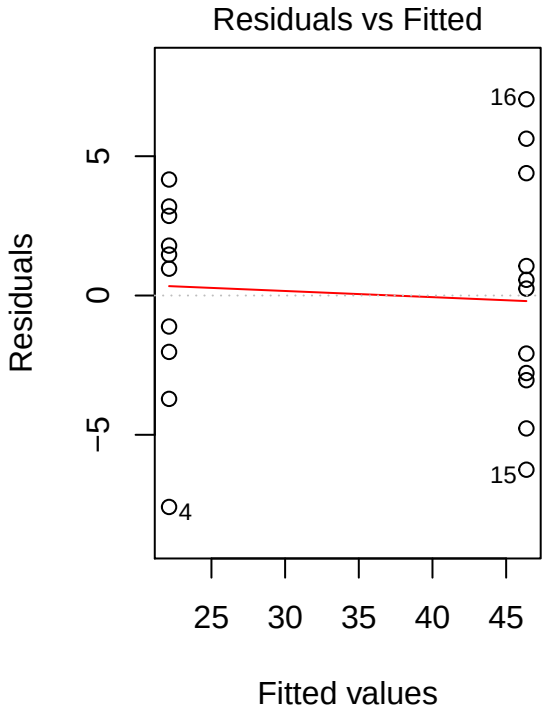
```
## ----------------------------------------------------------------
## a), b) & c)
```

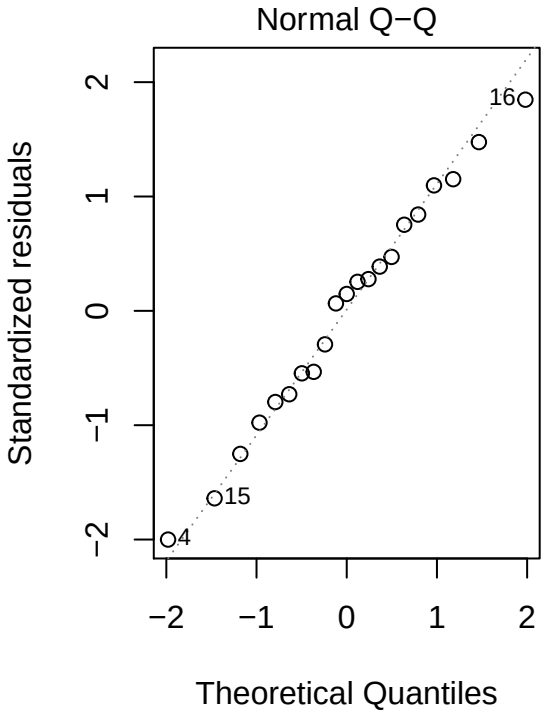


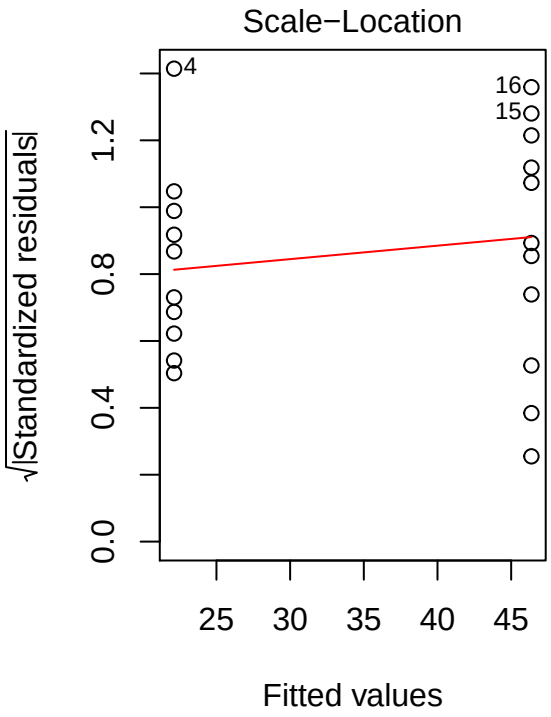

```
##
## Call:
## lm(formula = Y ~ X)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -7.590 -2.782  0.563  2.858  7.044
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  10.0000     1.9909   5.023 7.55e-05 ***
## X             2.0000     0.1441  13.874 2.15e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4 on 19 degrees of freedom
## Multiple R-squared:  0.9102, Adjusted R-squared:  0.9054
## F-statistic: 192.5 on 1 and 19 DF,  p-value: 2.153e-11
##
## ------------------------------------------------------------------
## d)
```

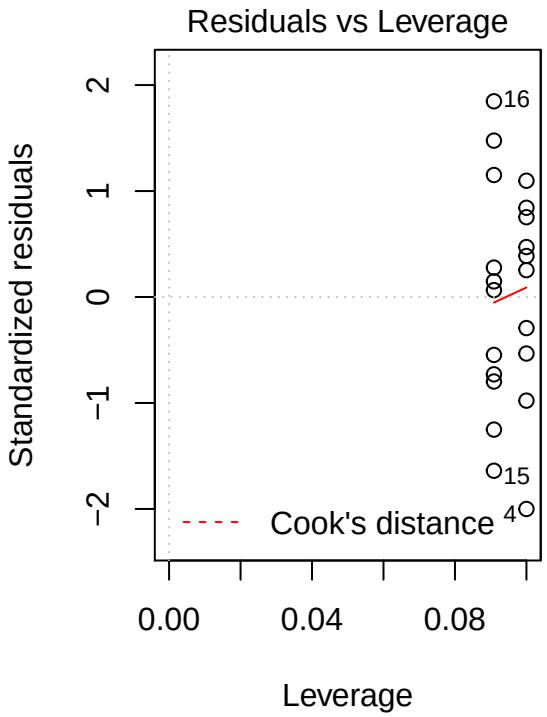

resid(m)
5
0
−5
6
8
10
14
18
X


dffits(m)
0.6
0.2
−0.2
−0.6
6
8
10
14
18
X

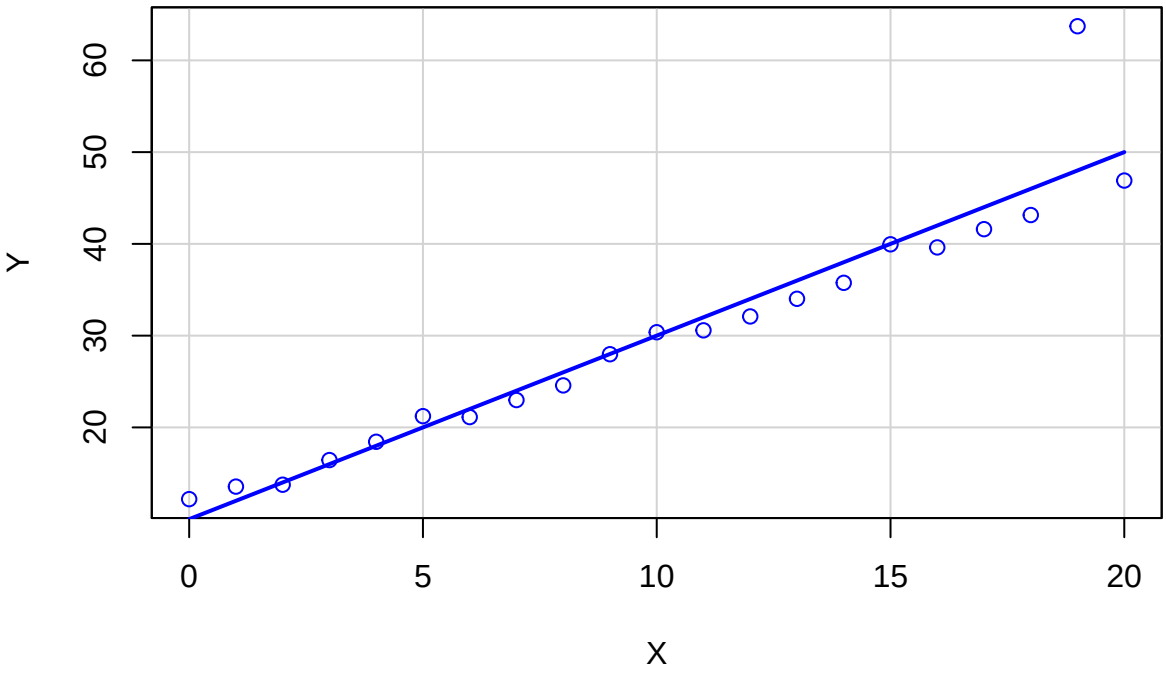

Residuals vs Fitted
Residuals
5
0
−5
16
15
4
25
30
35
40
45
Fitted values


Normal Q−Q
Standardized residuals
2
1
0
−1
−2
16
15
4
−2
−1
0
1
2
Theoretical Quantiles

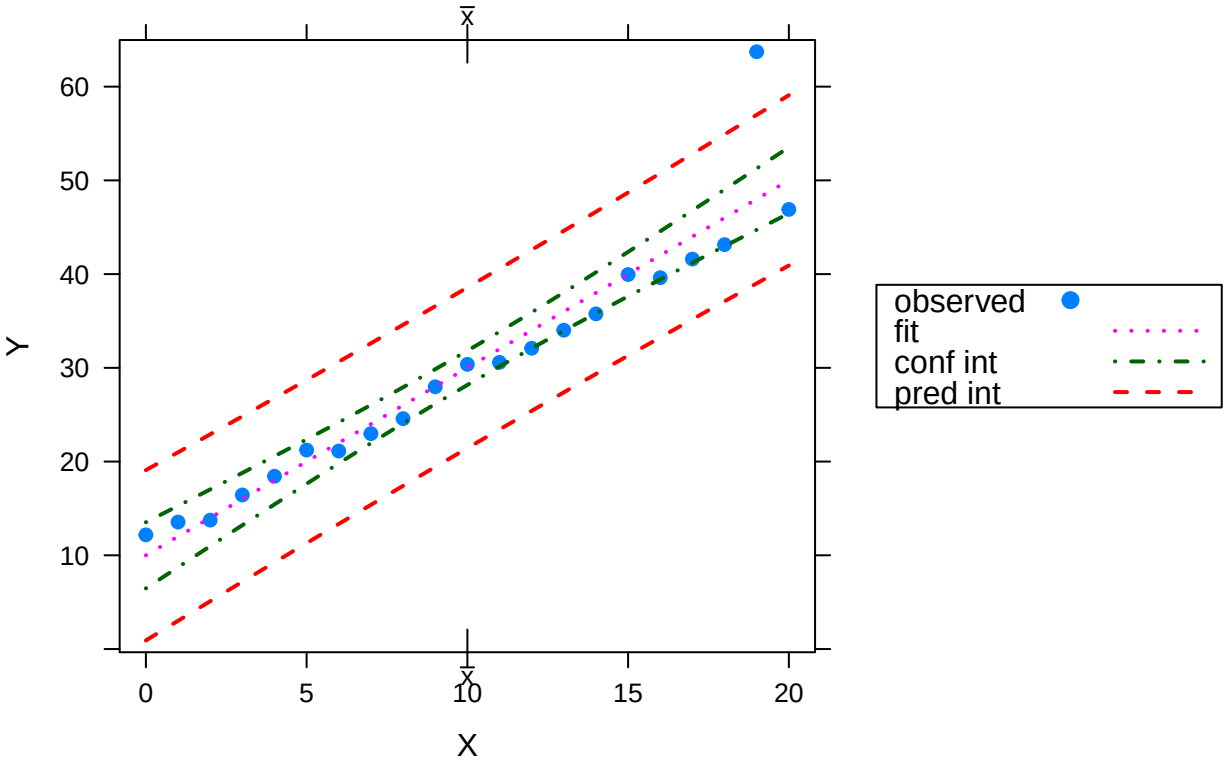

Scale−Location
√|Standardized residuals|
0.0
0.4
0.8
1.2
4
16
15
25
30
35
40
45
Fitted values


Residuals vs Leverage
Standardized residuals
−2
−1
0
1
2
16
15
4
Cook's distance
0.00
0.04
0.08
Leverage

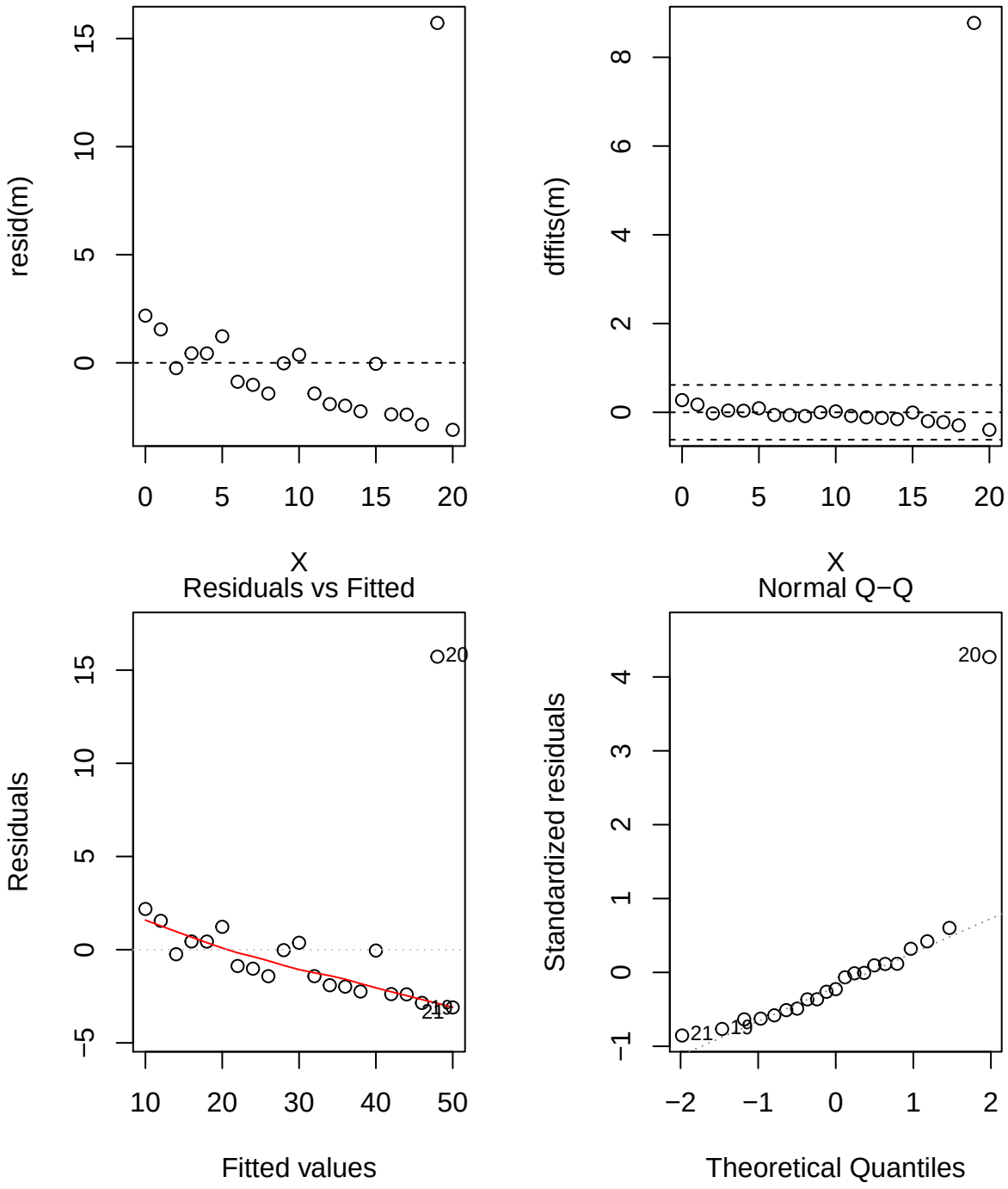
```
## ================================================================
## Reg 8
```

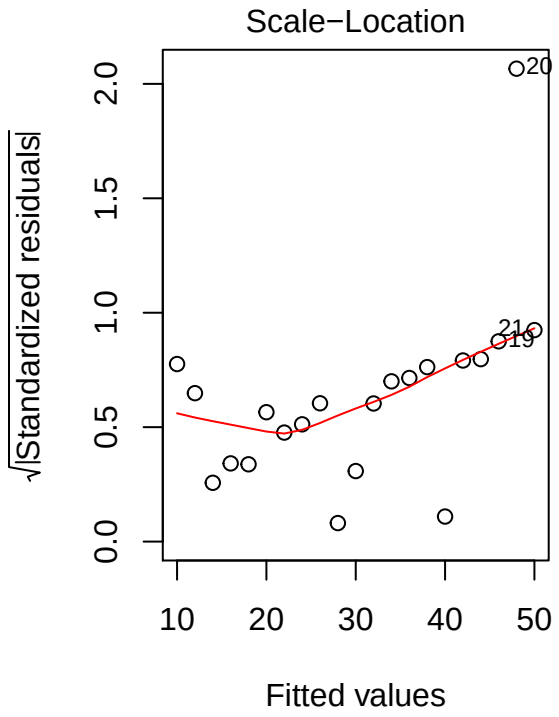

Y
20
30
40
50
60
0
5
10
15
20
X

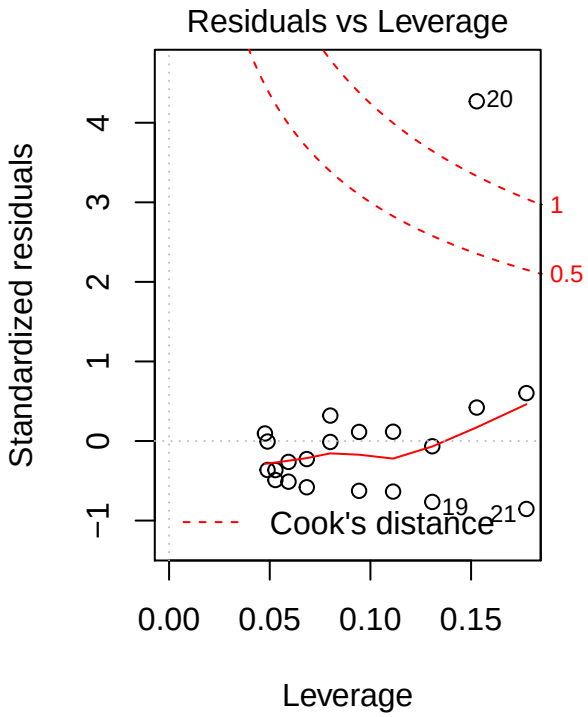
```
## ----------------------------------------------------------------
## a), b) & c)
```




```
##
## Call:
## lm(formula = Y ~ X)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.0982 -1.9827 -0.8758  0.4341 15.7201
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  10.0000     1.6852   5.934 1.03e-05 ***
## X             2.0000     0.1441  13.874 2.15e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4 on 19 degrees of freedom
## Multiple R-squared:  0.9102, Adjusted R-squared:  0.9054
## F-statistic: 192.5 on 1 and 19 DF,  p-value: 2.153e-11
##
## ------------------------------------------------------------------
## d)
```


resid(m)
X
dffits(m)
X
Residuals vs Fitted
Residuals
Fitted values
Normal Q−Q
Standardized residuals
Theoretical Quantiles
20
21
19


Scale−Location
√|Standardized residuals|
0.0
0.5
1.0
1.5
2.0
10
20
30
40
50
Fitted values
20
21
19


Residuals vs Leverage
Standardized residuals
−1
0
1
2
3
4
0.00
0.05
0.10
0.15
Leverage
Cook's distance
1
0.5
20
19
21