

TMA4267 Linear statistical models

Spring 2026

Thea Bjørnland

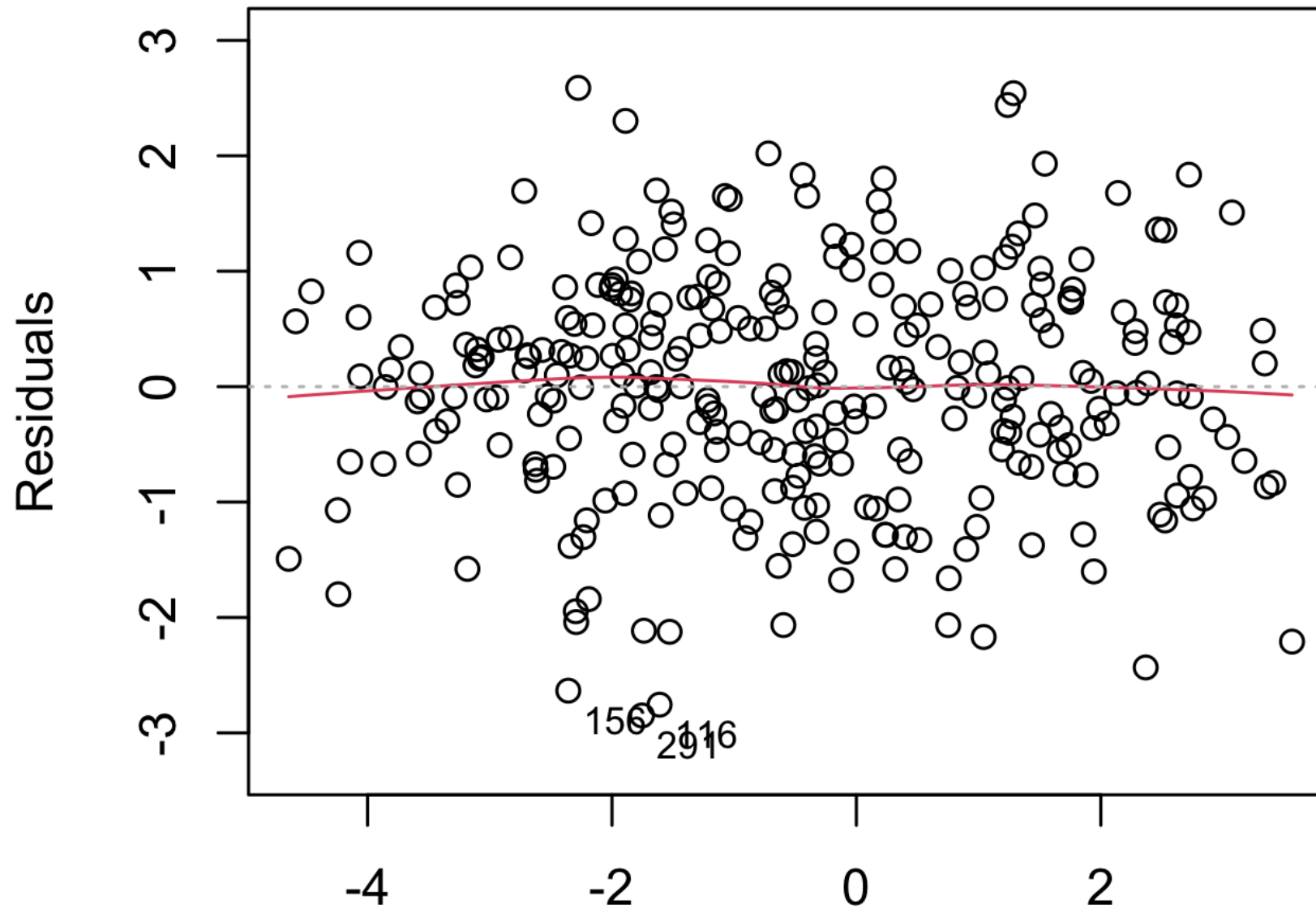
Part 2: Chapters 6, 7, 8, 9, 17

Week	Tuesday	Thursday	Friday
6		Chapter 6 and R	Assignments 1, 2, 3, Install R and RStudio
7	Chapter 7 (7.3, 7.6, 7.7)	Assignment 4 Room VE22 - SMASH	
8	Chapter 7/8	Chapter 7/8	Cancelled*
9	Chapter 7/8/17	Assignment 5	Cancelled*
10	Chapter 7/17	Chapter 17	Cancelled*
11	Chapter 9	Assignment 6 <i>Main building (Hovedbygningen) 326</i>	Cancelled*

* Due to no-show, contact us if you need extra help

Correct model

Residuals vs Fitted



Fitted values
`lm(y_correct ~ x1 + x2)`

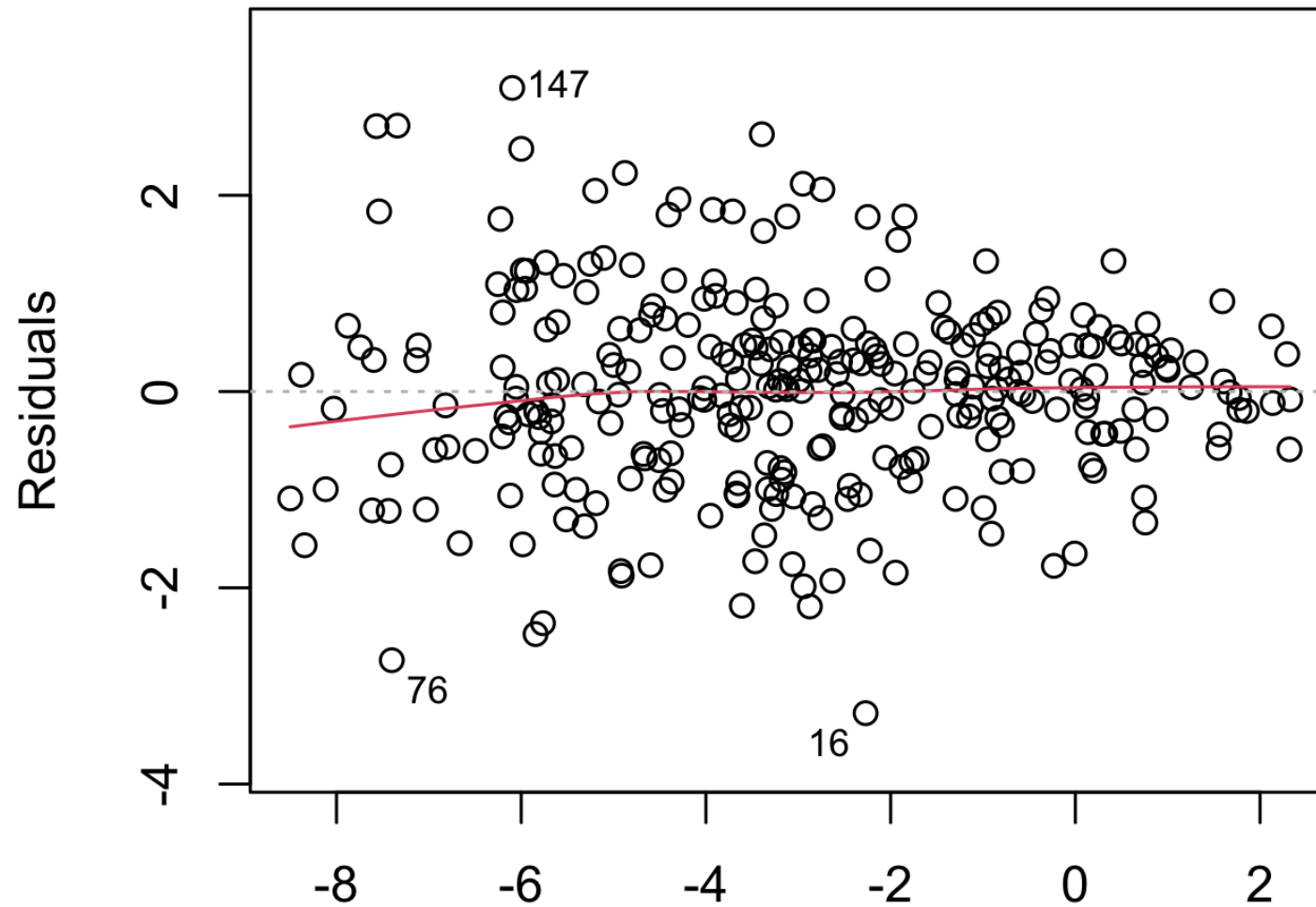
Call:
`lm(formula = y_correct ~ x1 + x2)`

Coefficients:

(Intercept)	x1	x2
2.125	1.458	-1.047

Heteroskedasticity

Residuals vs Fitted



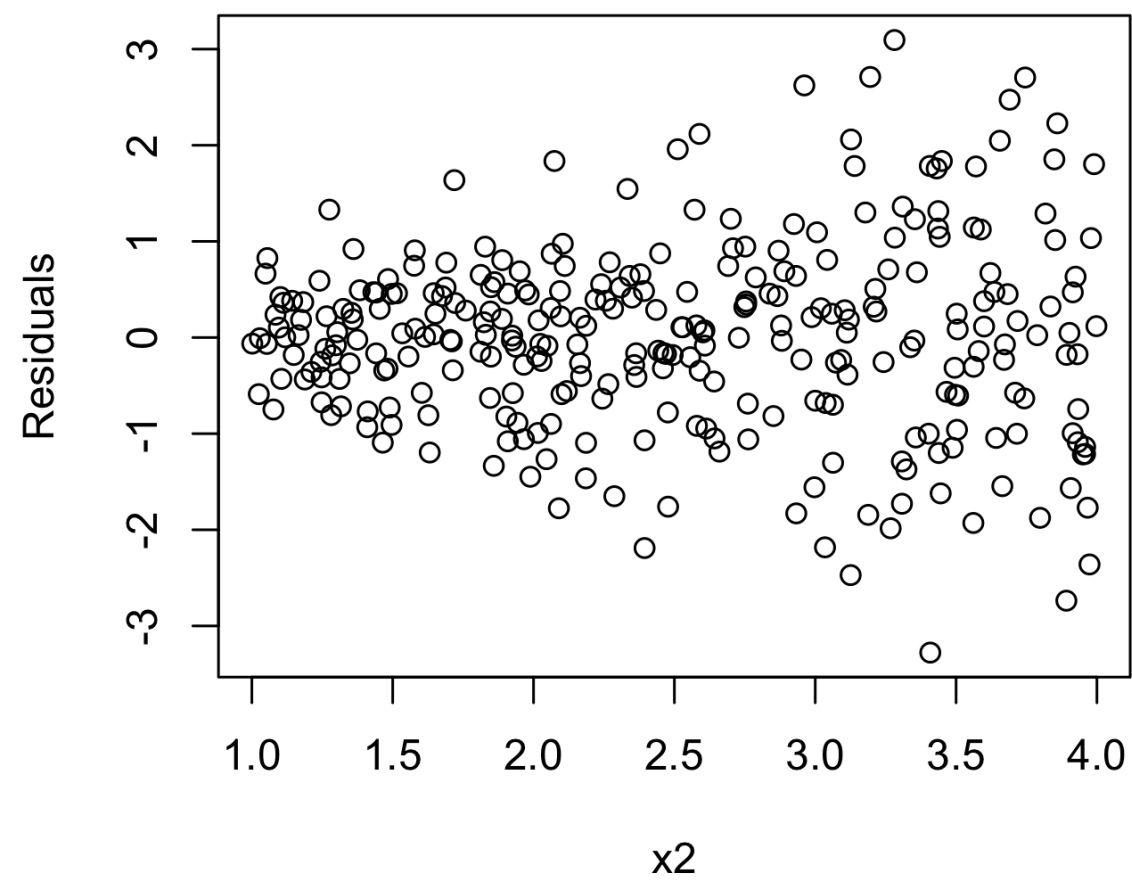
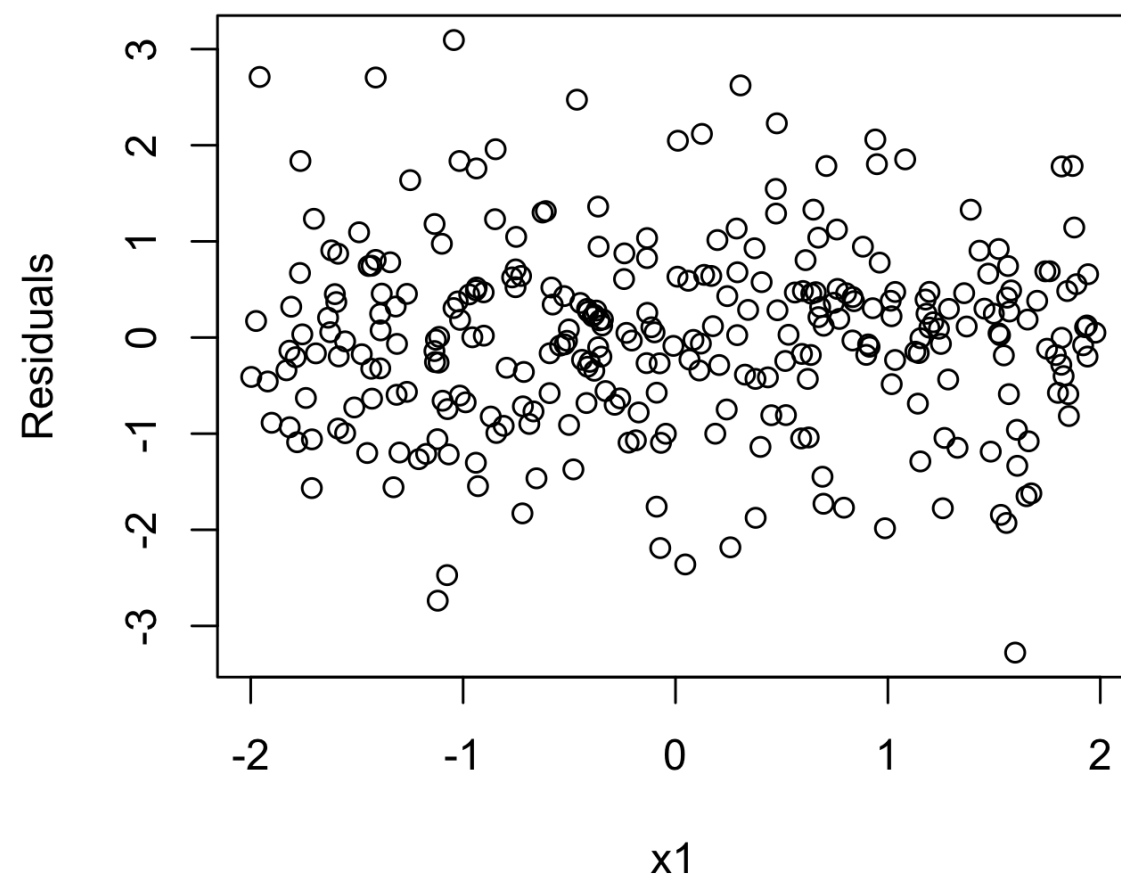
Fitted values
 $\text{lm}(y\_hetero \sim x1 + x2)$

Call:

$\text{lm}(\text{formula} = y\_hetero \sim x1 + x2)$

Coefficients:

(Intercept)	x1	x2
1.891	1.542	-1.944



Call:

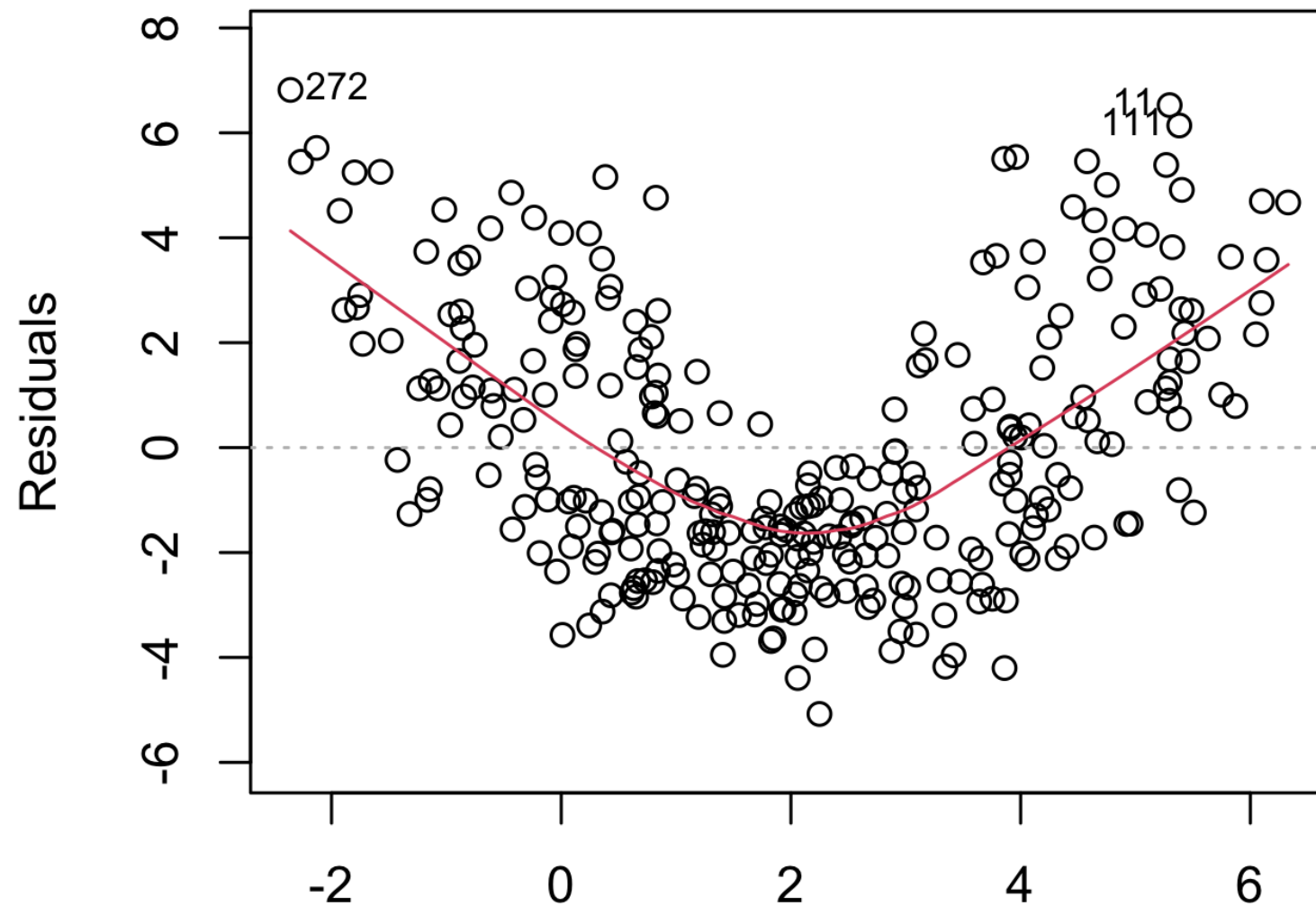
```
lm(formula = y_hetero ~ x1 + x2)
```

Coefficients:

(Intercept)	x1	x2
1.891	1.542	-1.944

Missing quadratic term

Residuals vs Fitted



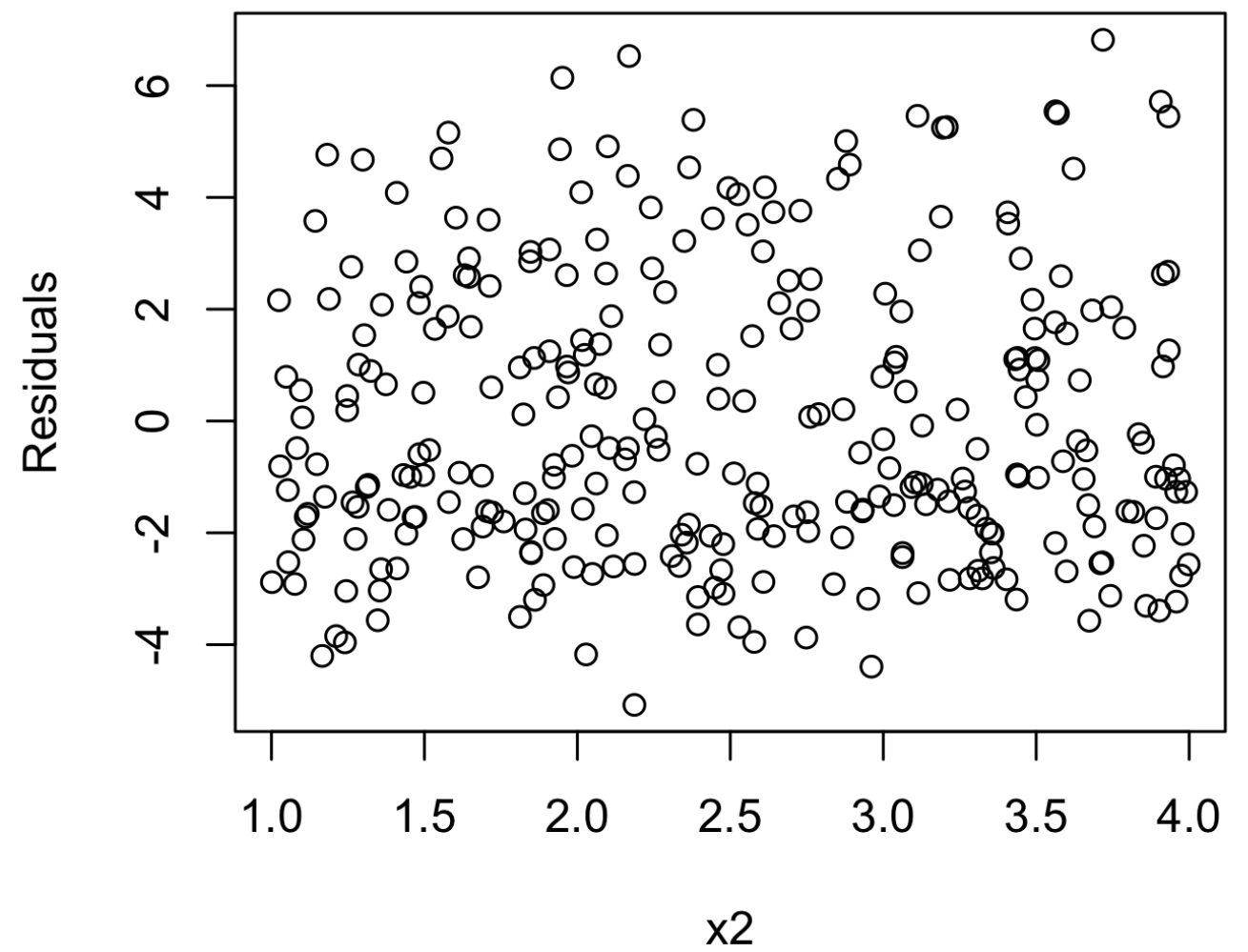
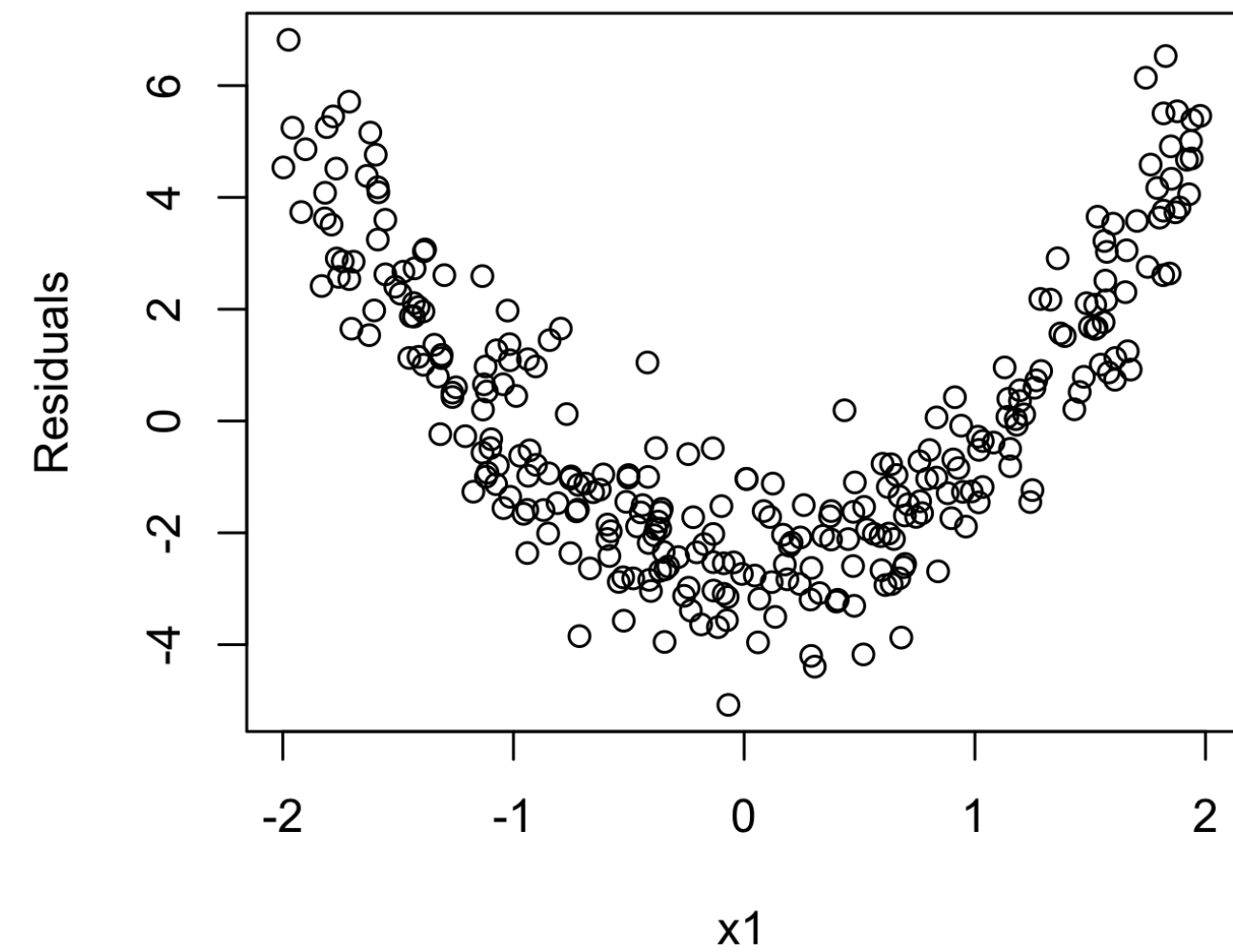
Fitted values
`lm(y_poly ~ x1 + x2)`

Call:

`lm(formula = y_poly ~ x1 + x2)`

Coefficients:

(Intercept)	x1	x2
4.581	1.599	-1.017



Call:

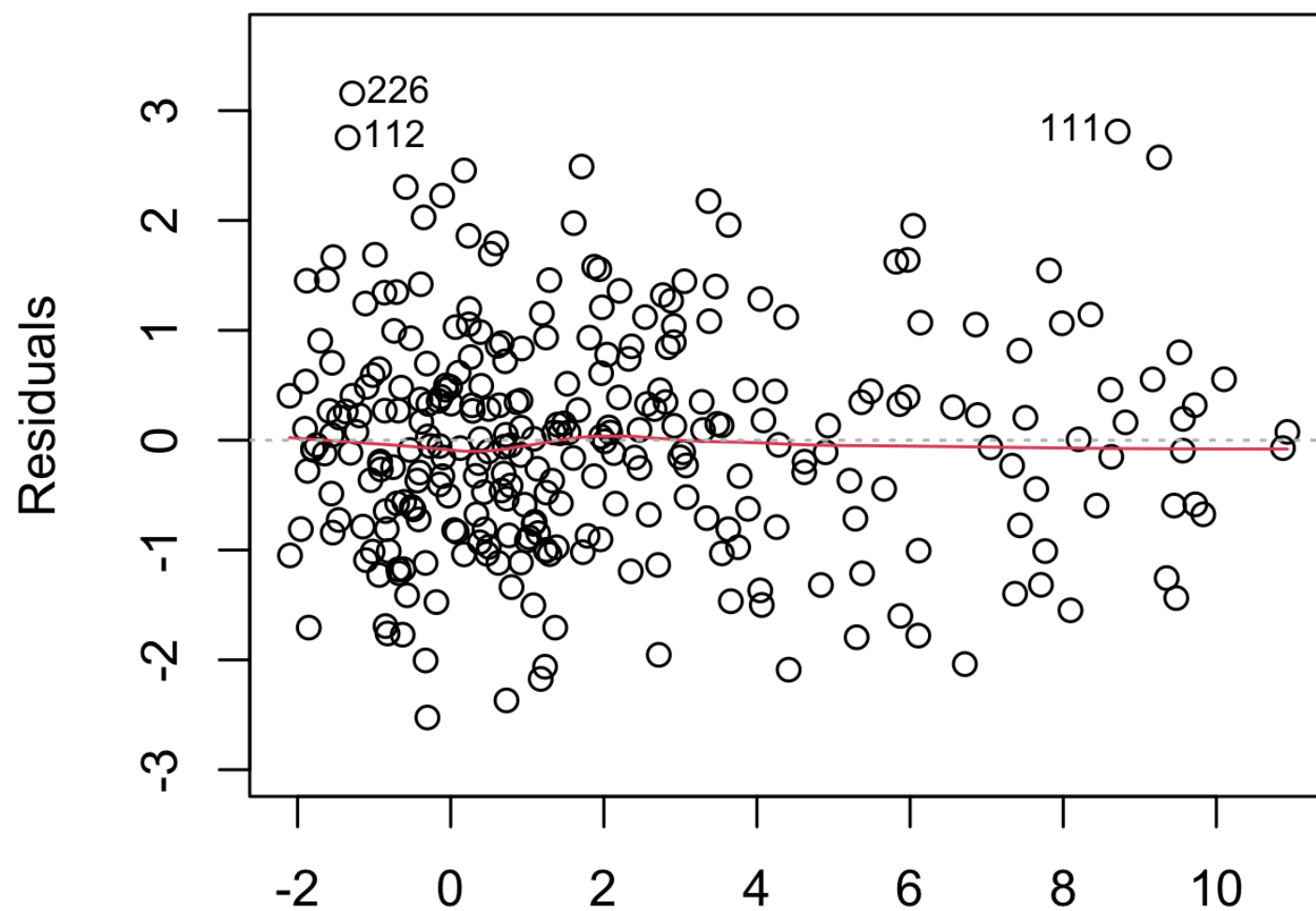
```
lm(formula = y_poly ~ x1 + x2)
```

Coefficients:

(Intercept)	x1	x2
4.581	1.599	-1.017

Including quadratic term

Residuals vs Fitted



Fitted values
 $\text{lm}(y\_poly \sim x1 + x2 + x1sqr)$

Call:

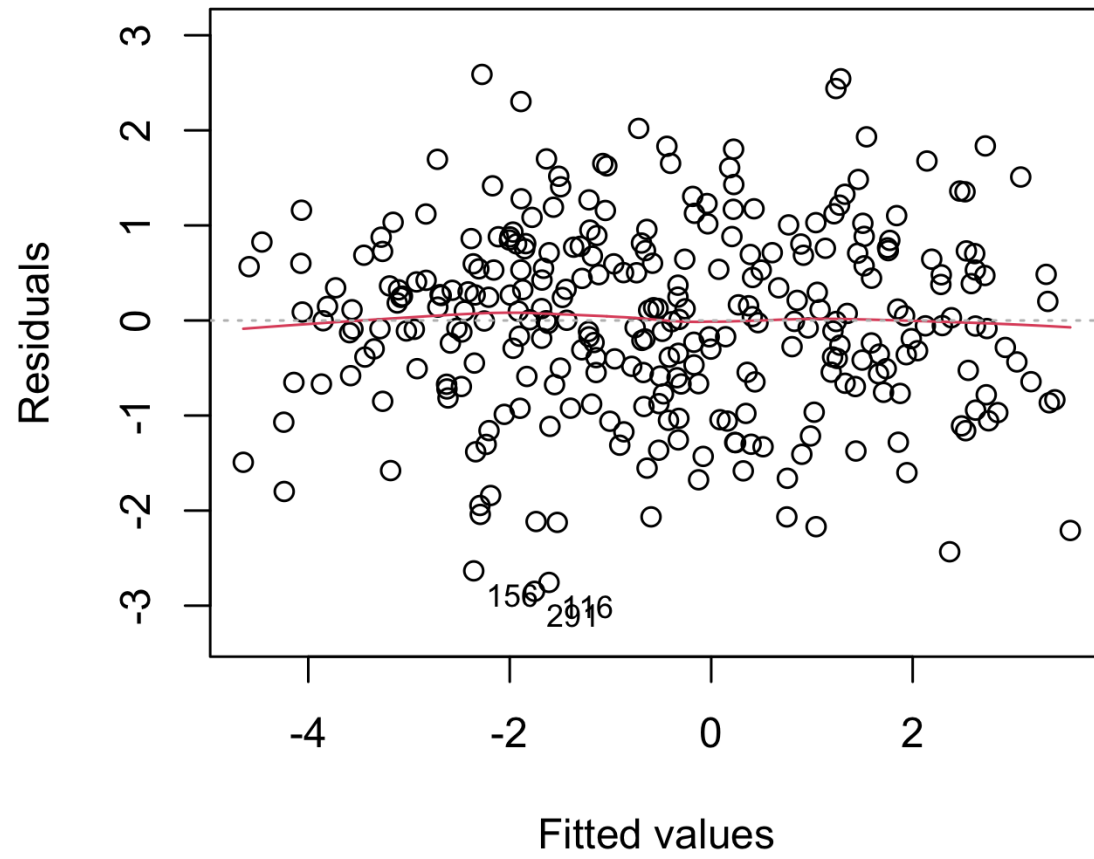
```
lm(formula = y_poly ~ x1 + x2 + x1sqr)
```

Coefficients:

(Intercept)	x1	x2	x1sqr
1.898	1.451	-0.966	2.036

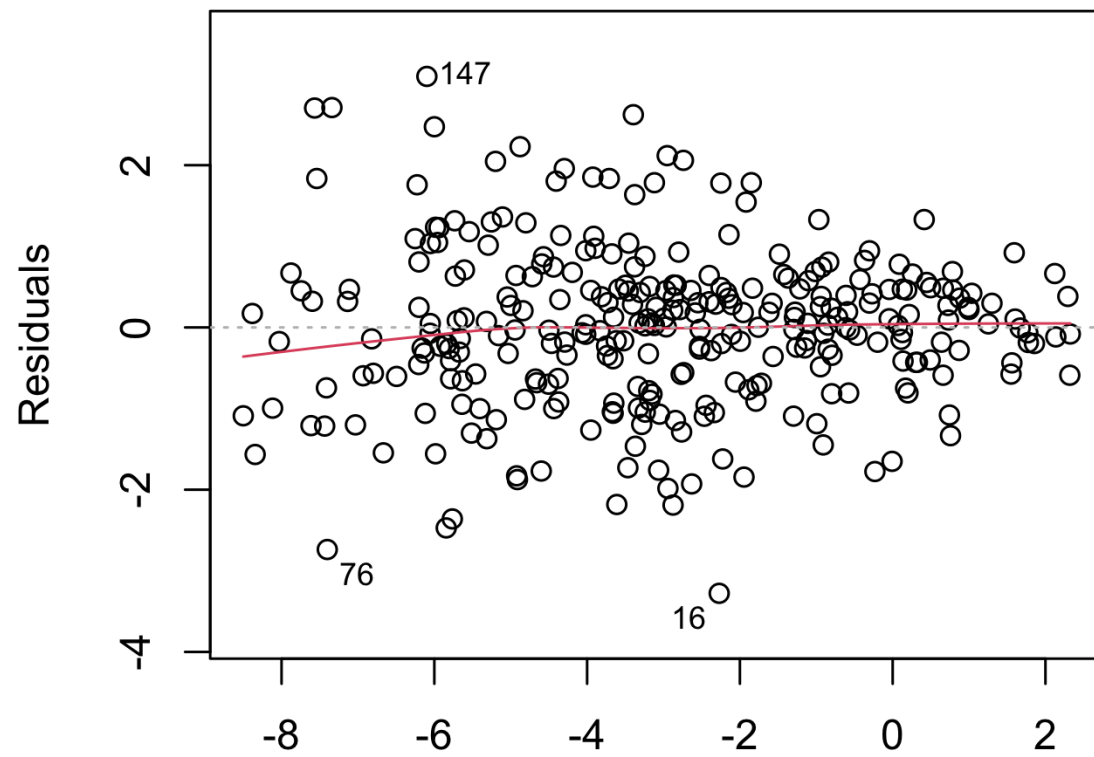
Correct model

Residuals vs Fitted



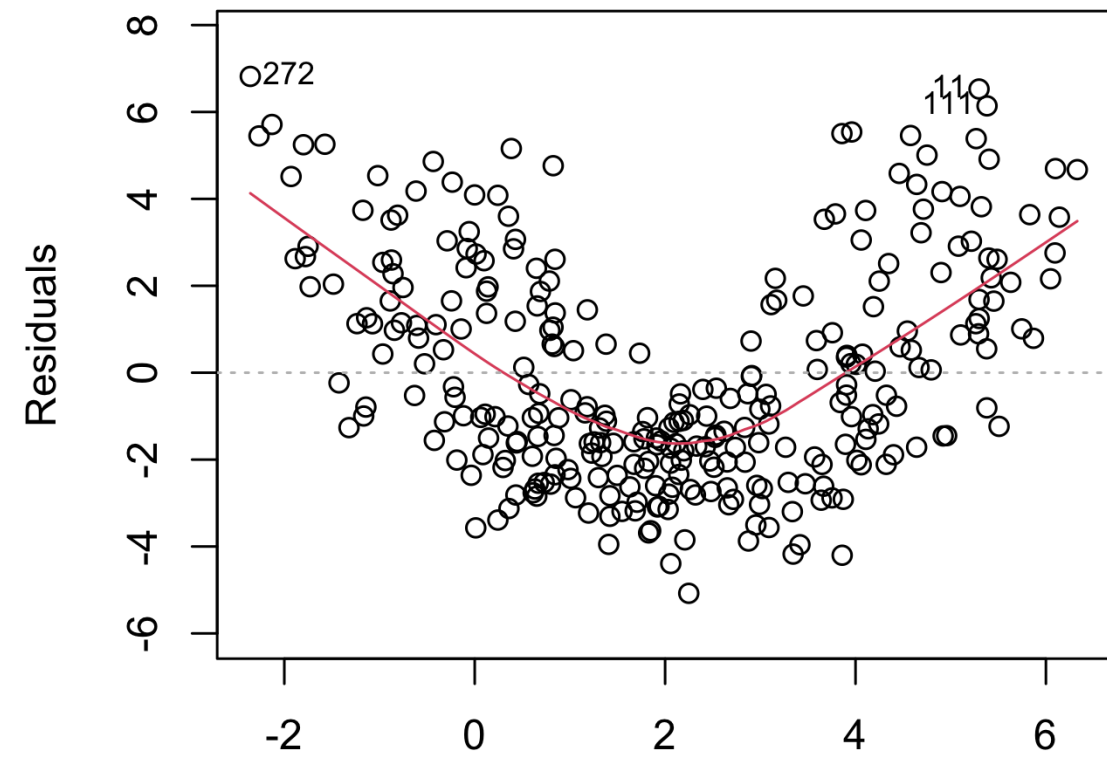
Heteroskedasticity

Residuals vs Fitted



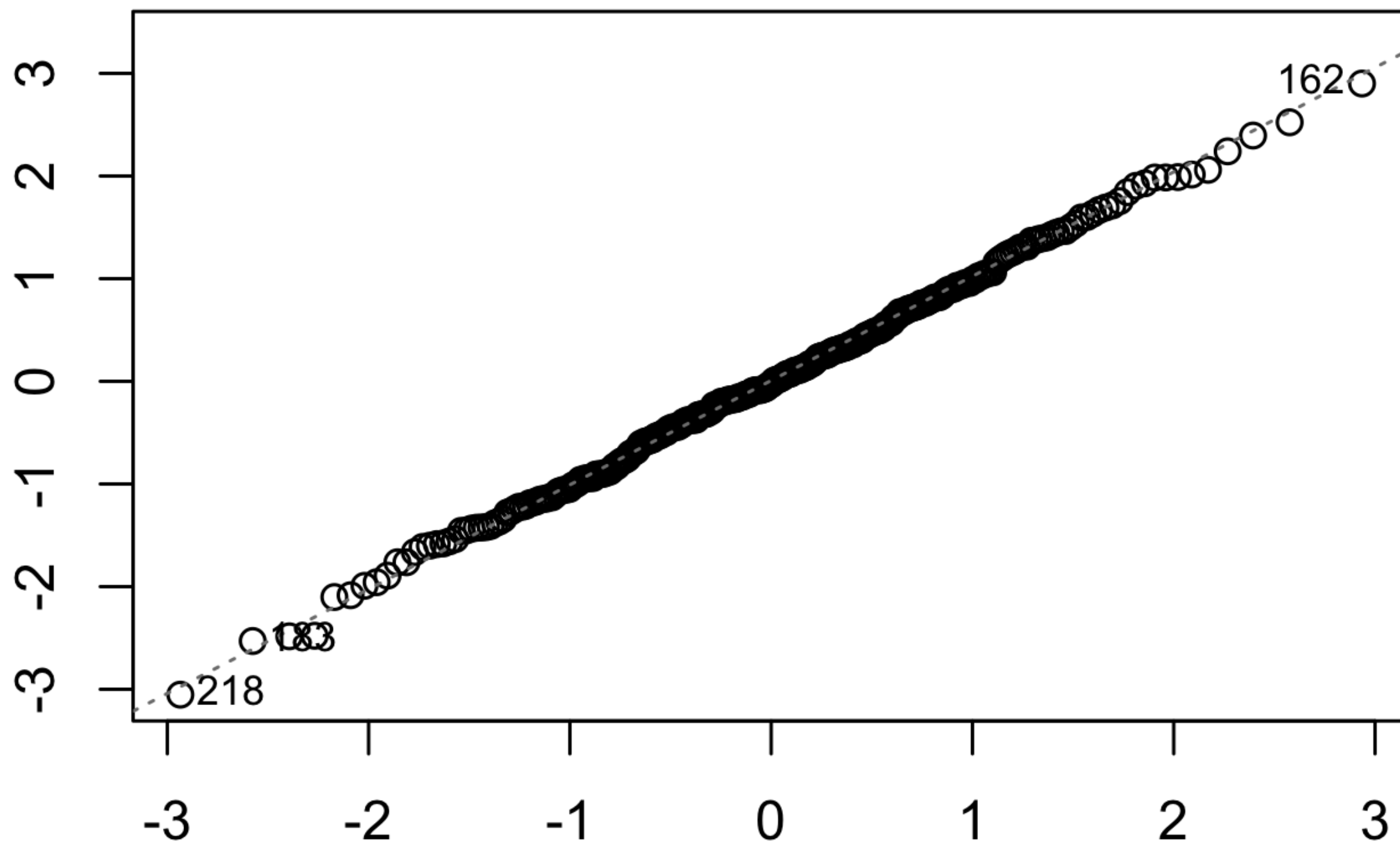
Missing quadratic term

Residuals vs Fitted



Normal errors

Q-Q Residuals

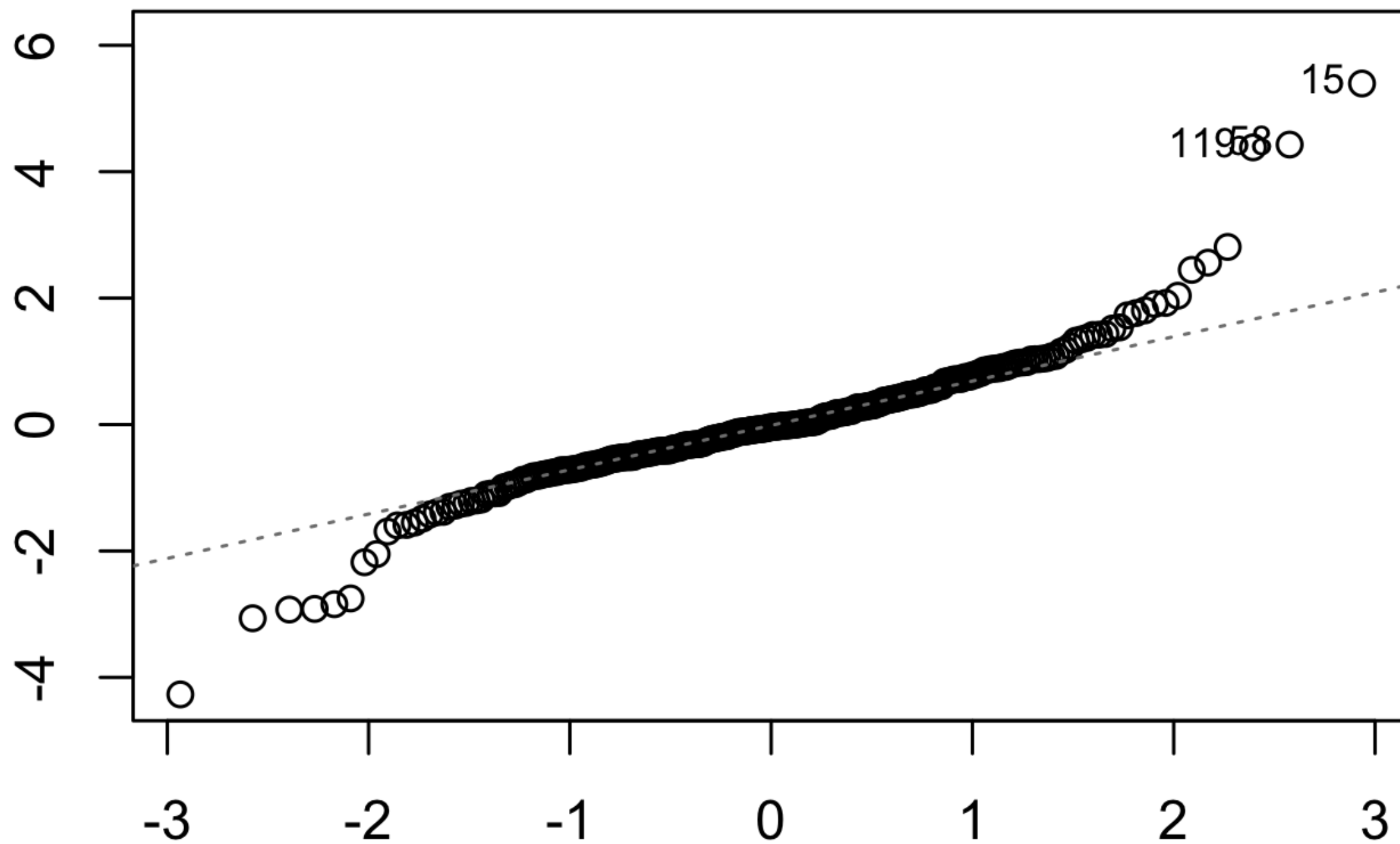


Theoretical Quantiles

$\text{lm}(y \sim x1 + x2)$

Heavy-tailed errors

Q-Q Residuals

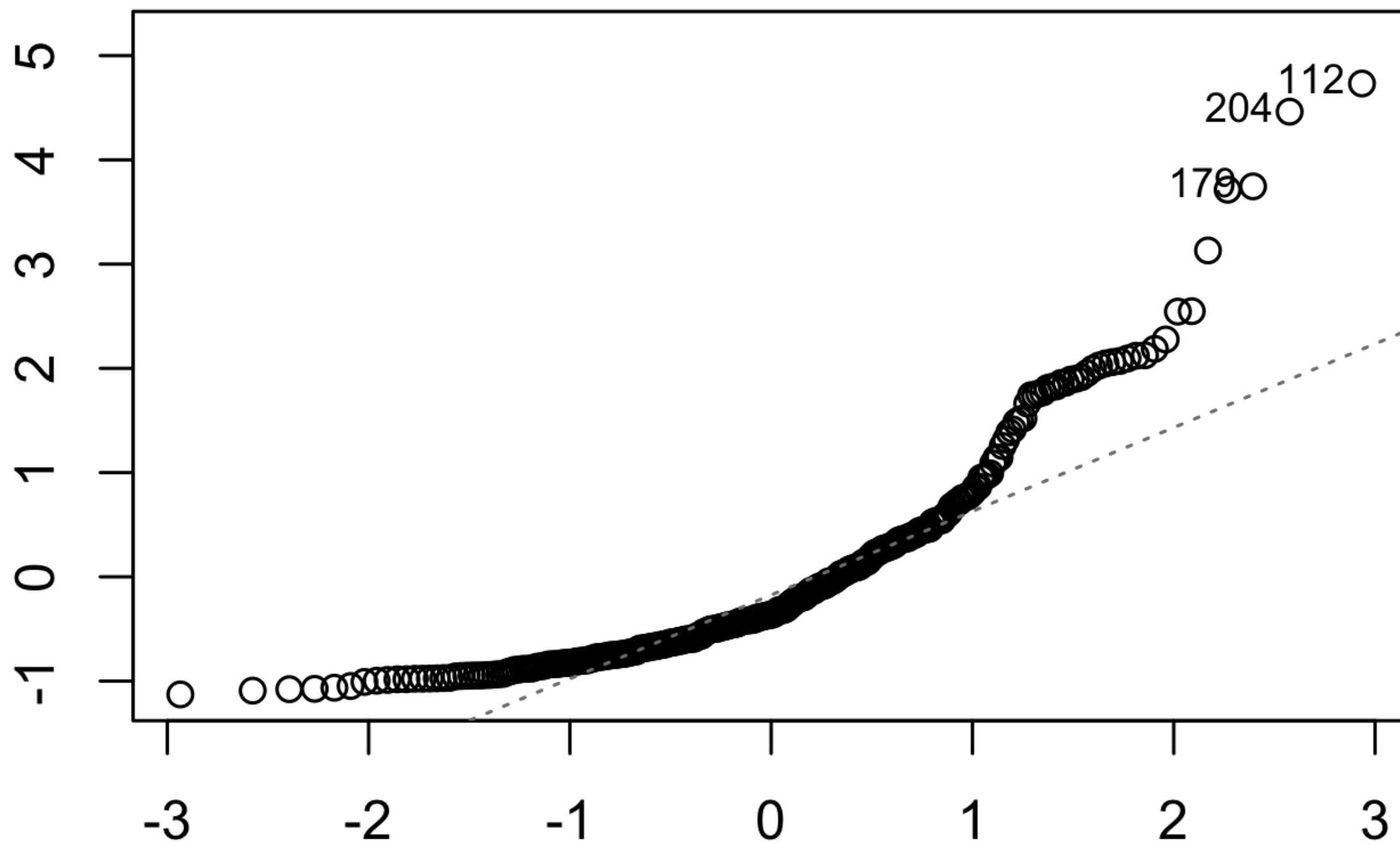


Theoretical Quantiles

$\text{lm}(y \sim x1 + x2)$

Skewed errors

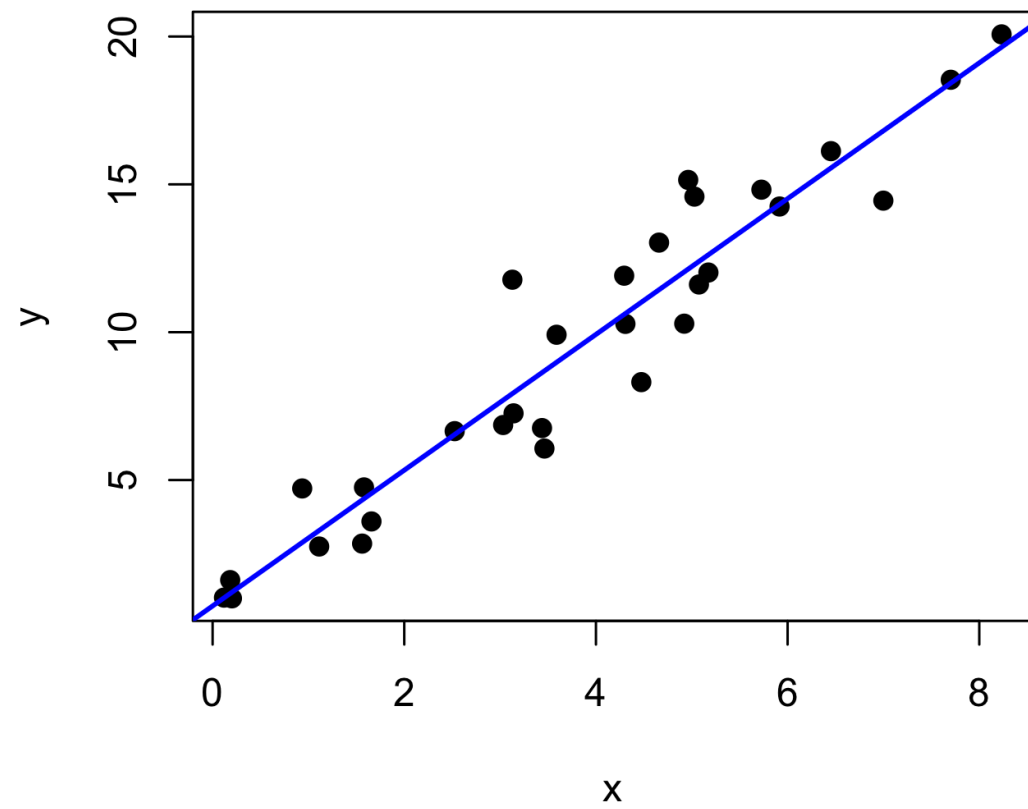
Q-Q Residuals



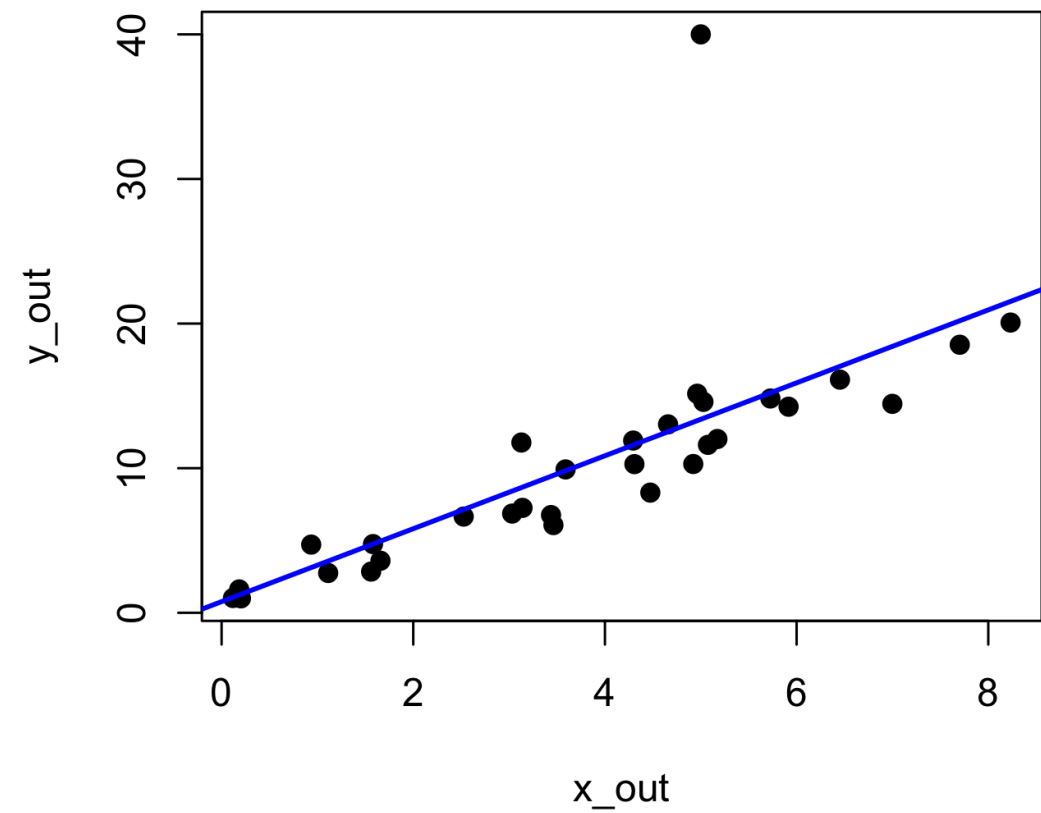
Theoretical Quantiles

$\text{lm}(y \sim x1 + x2)$

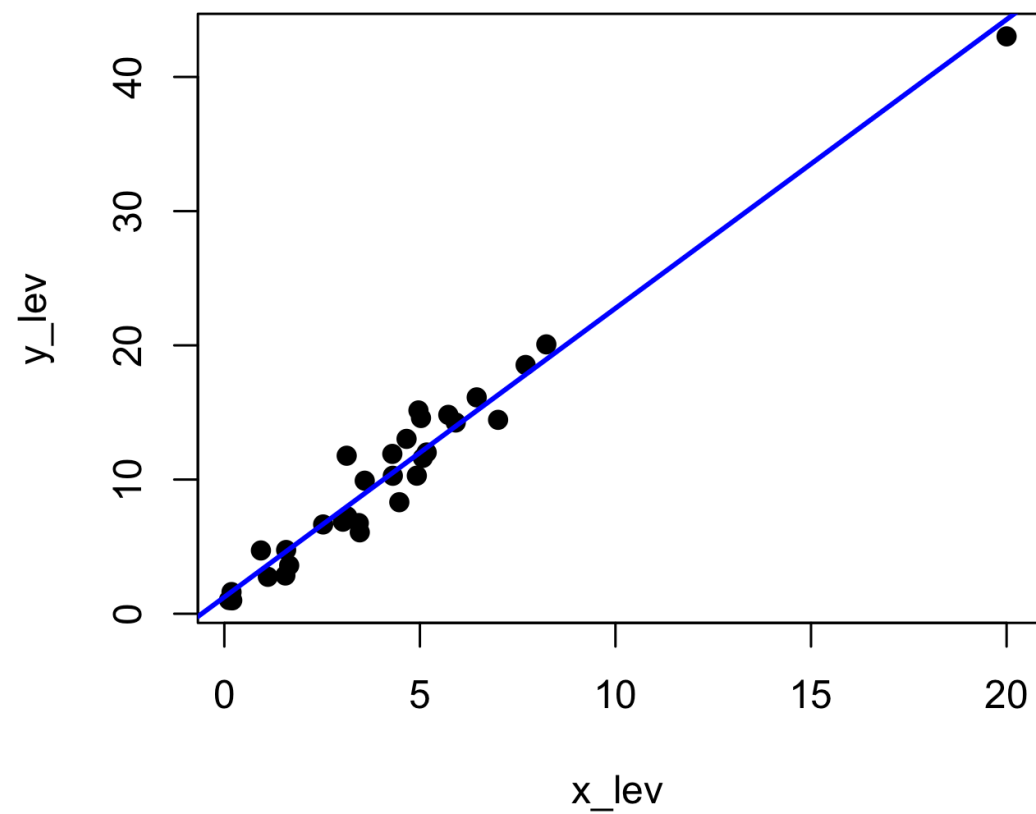
Baseline data



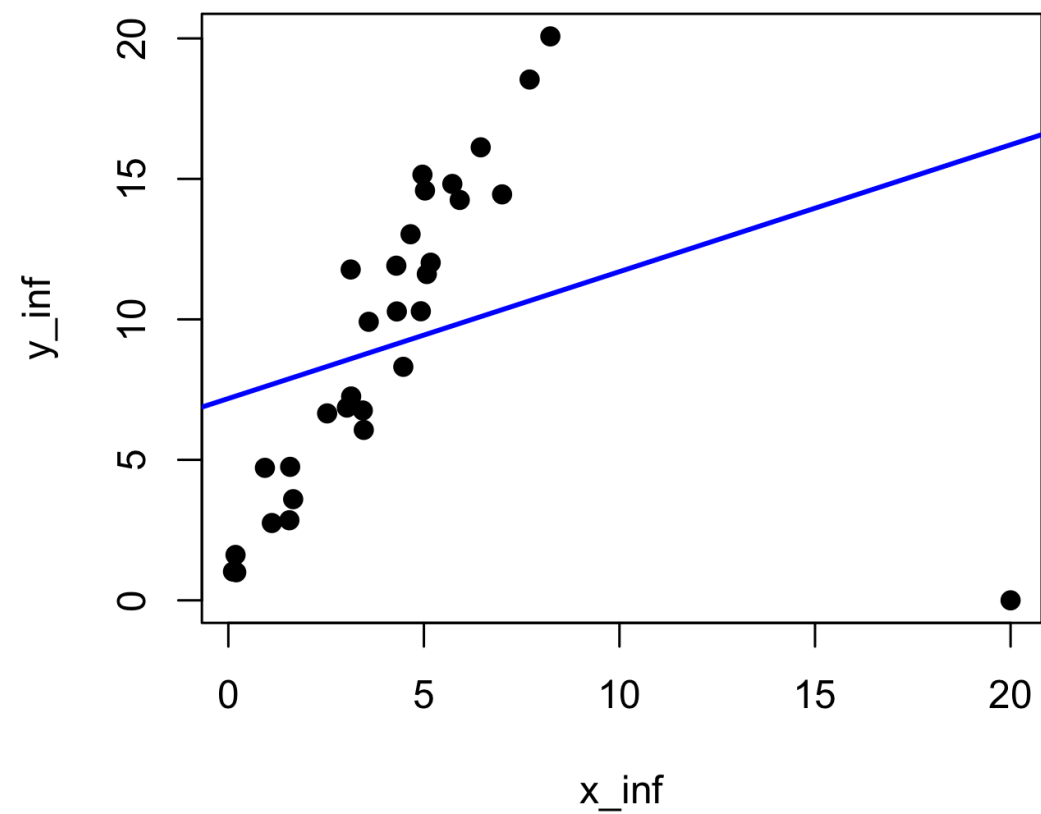
Vertical outlier



High leverage

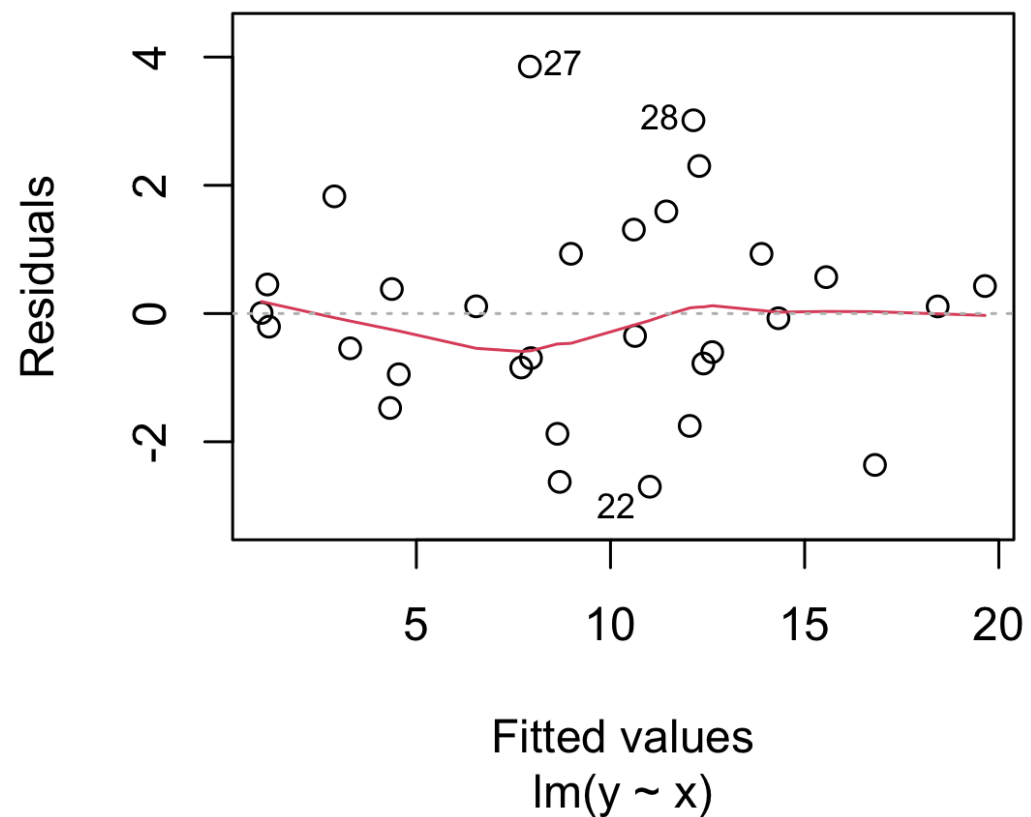


Influential point



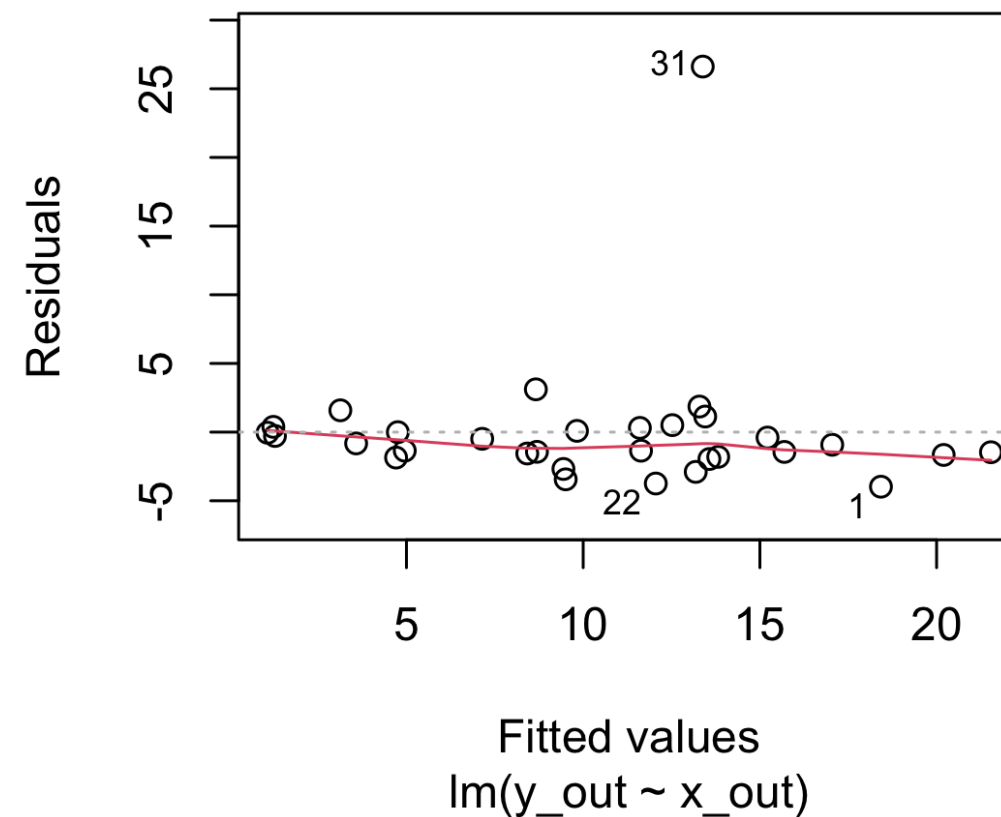
Baseline data

Residuals vs Fitted



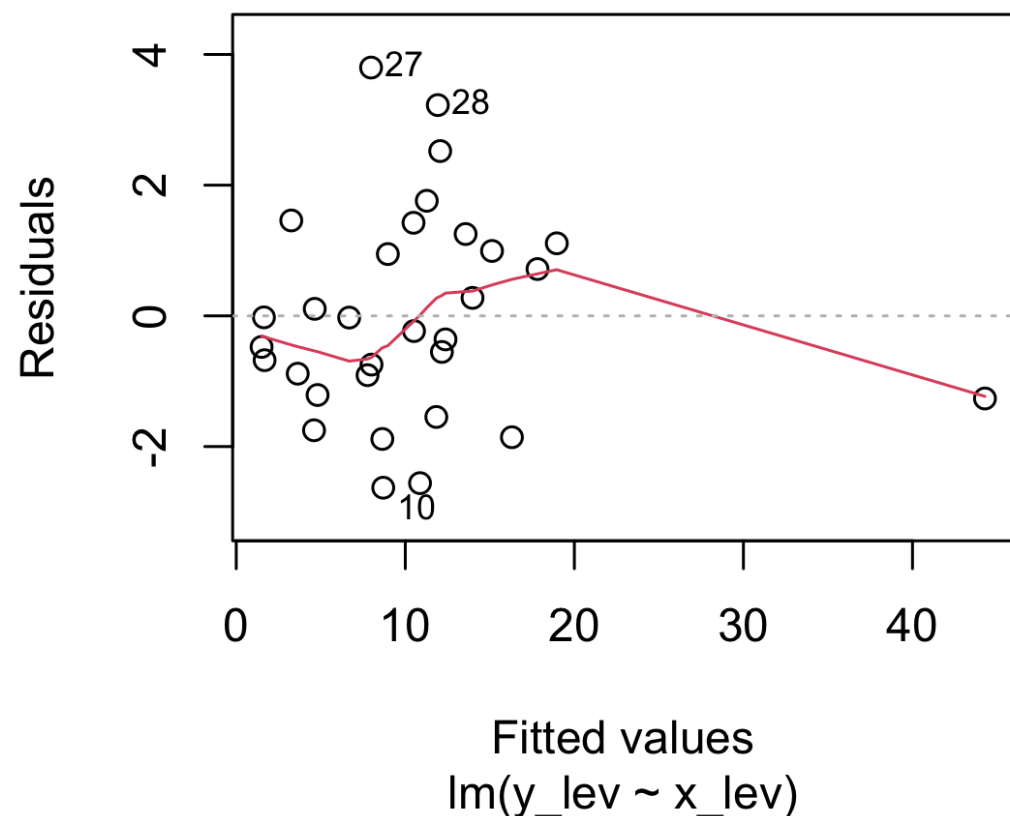
Vertical outlier

Residuals vs Fitted



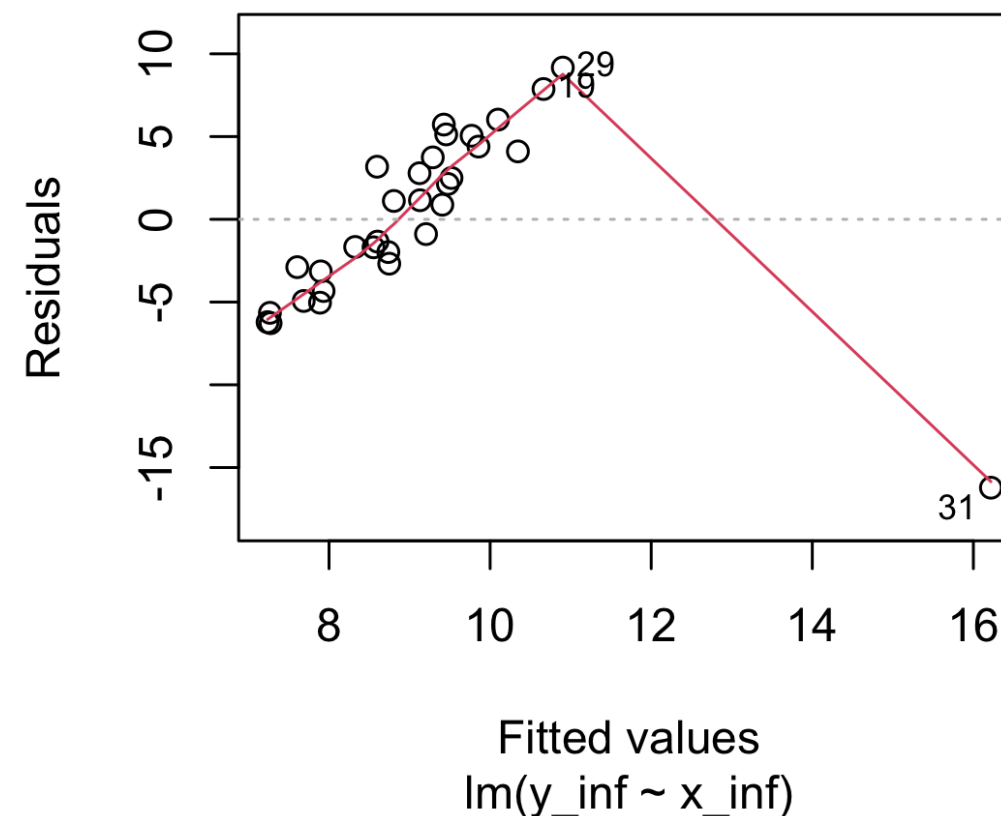
High leverage

Residuals vs Fitted



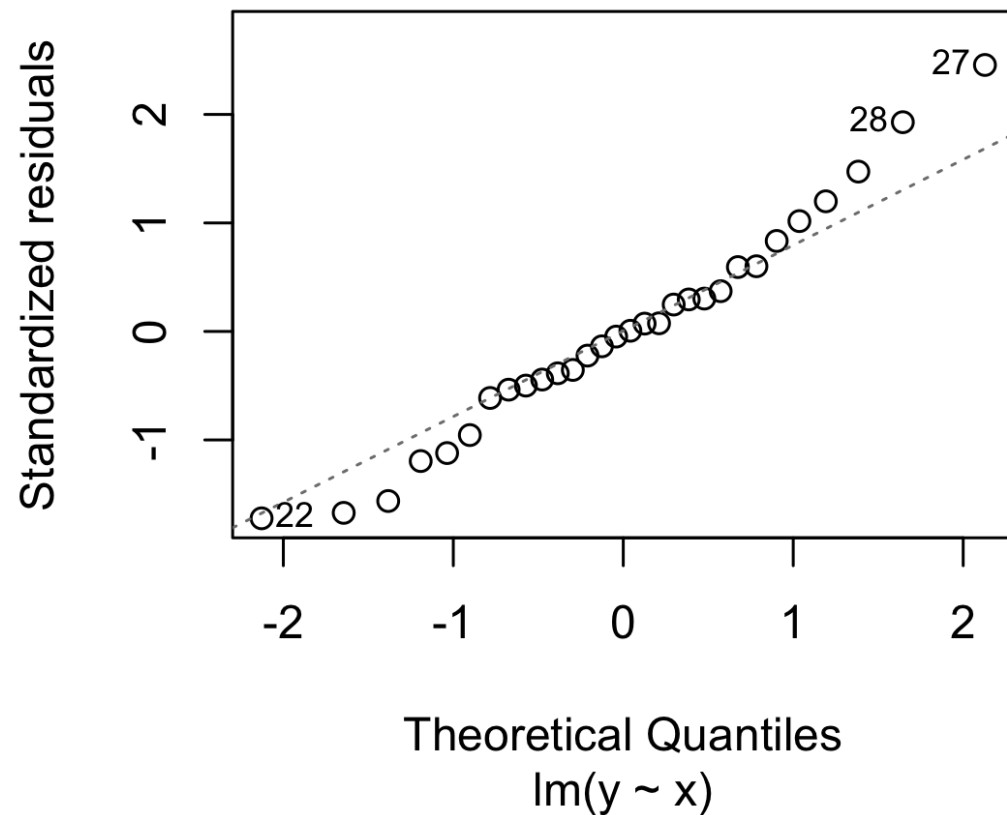
Influential point

Residuals vs Fitted



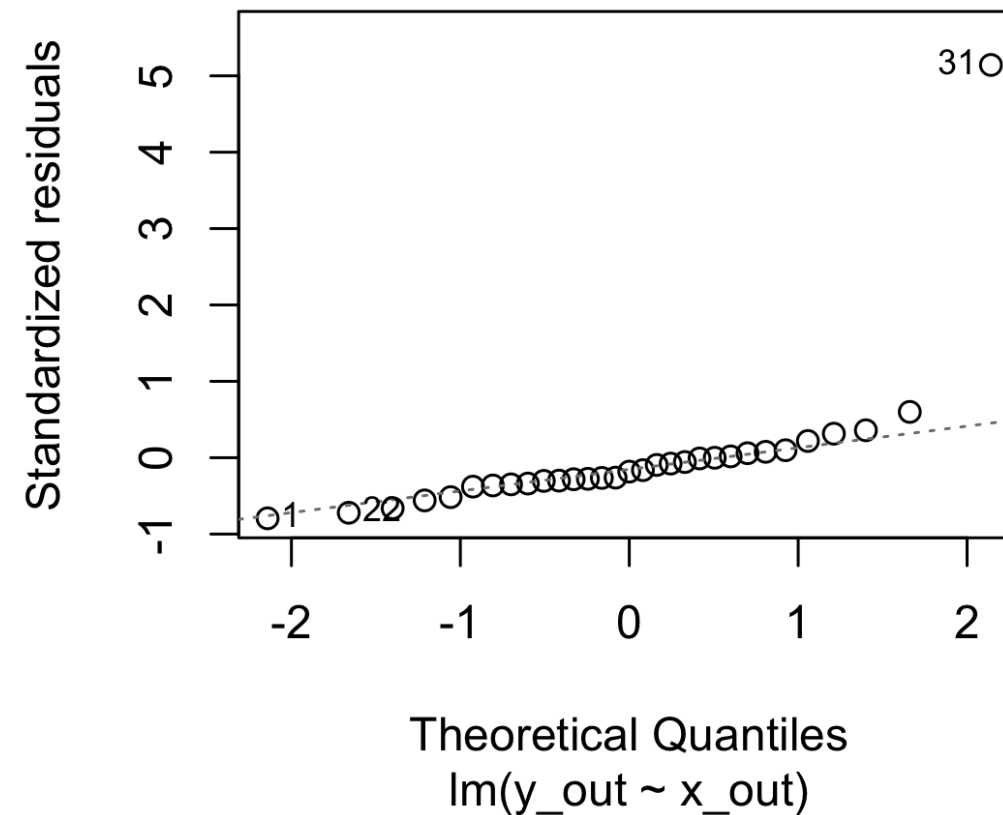
Baseline data

Q-Q Residuals



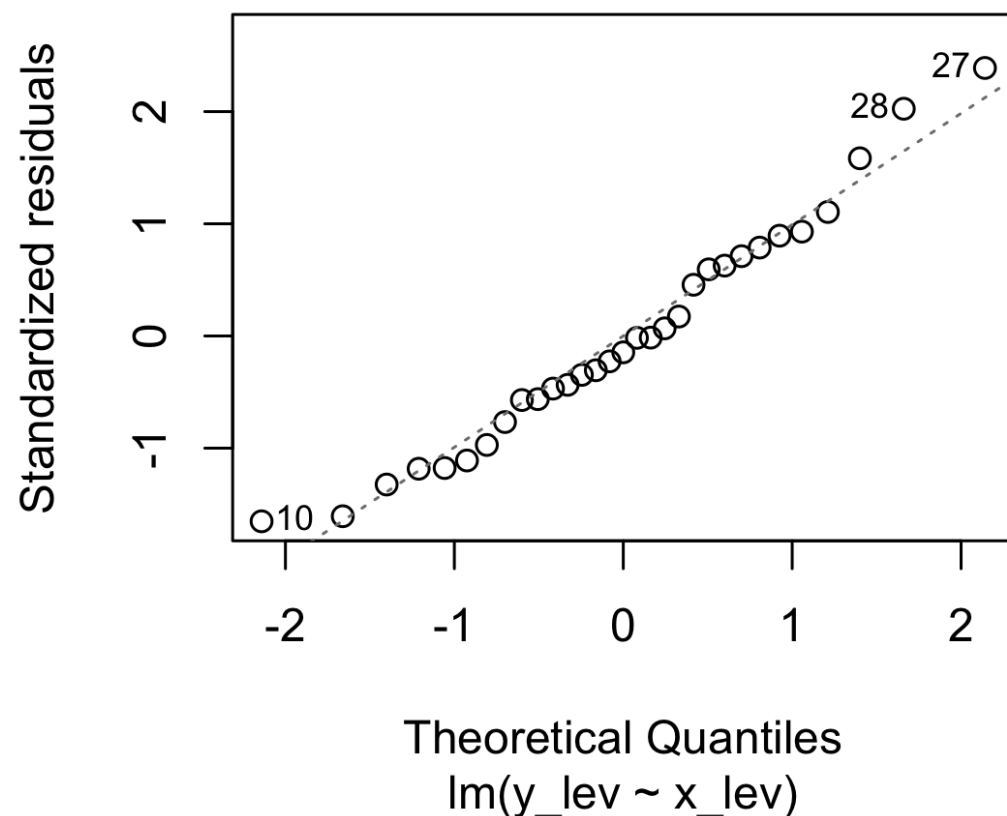
Vertical outlier

Q-Q Residuals



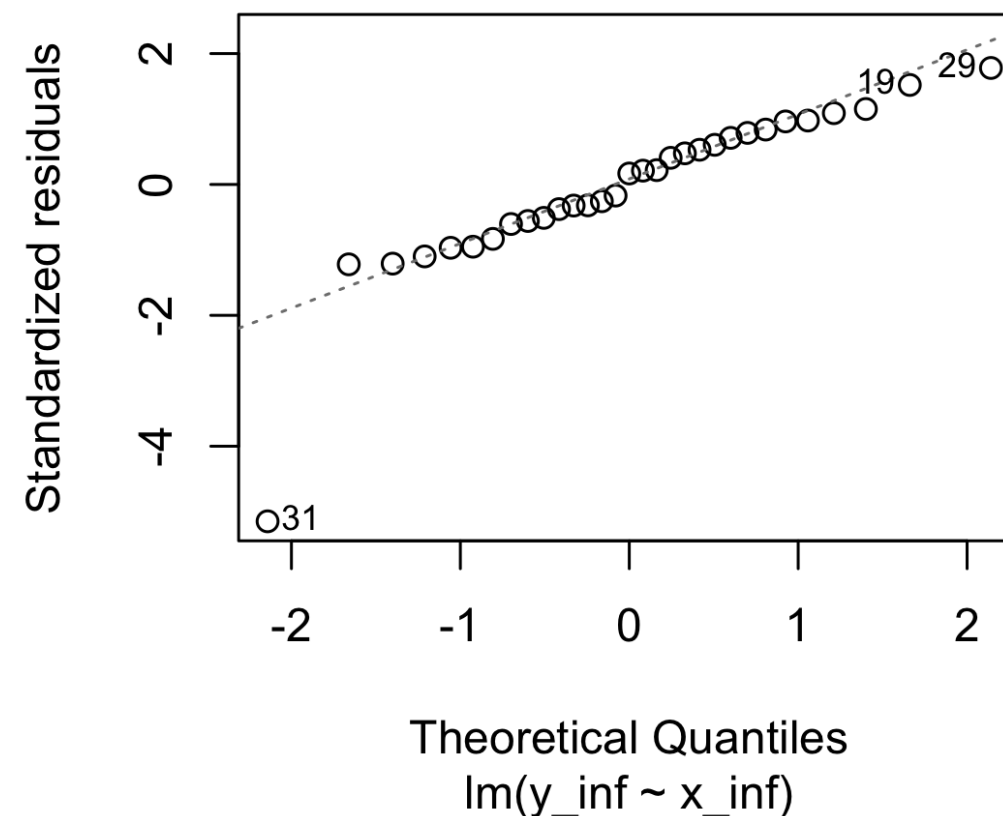
High leverage

Q-Q Residuals



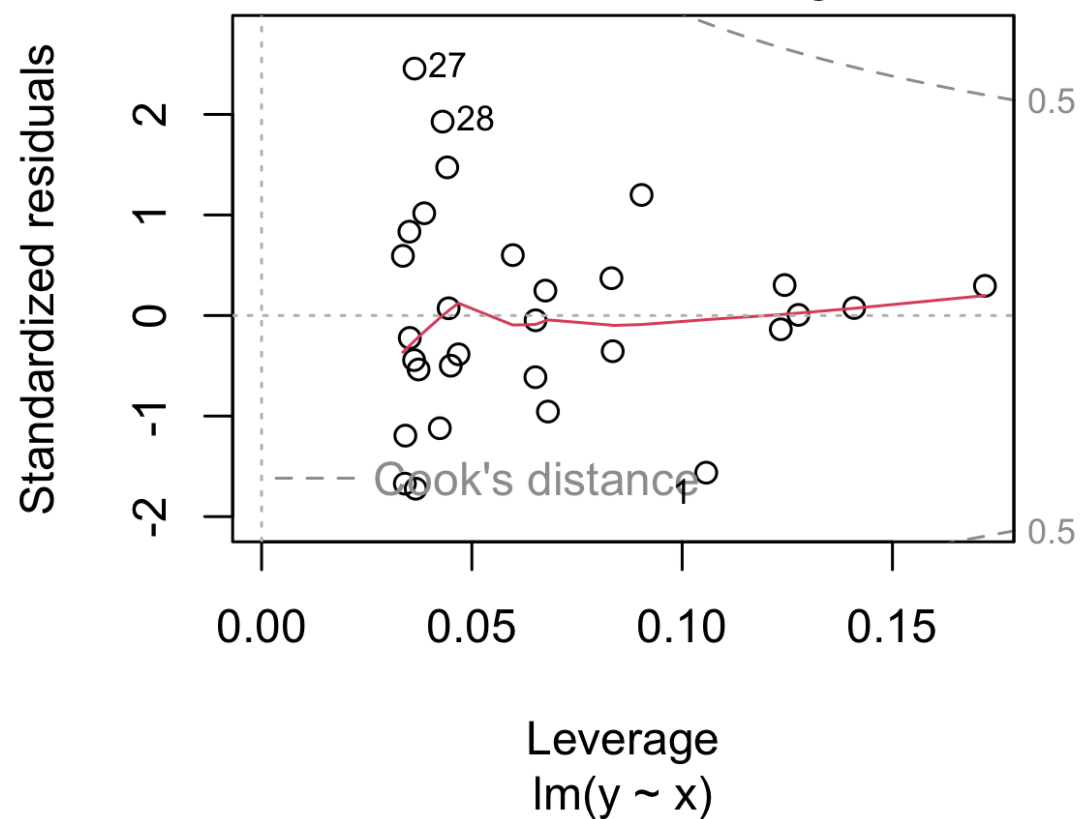
Influential point

Q-Q Residuals



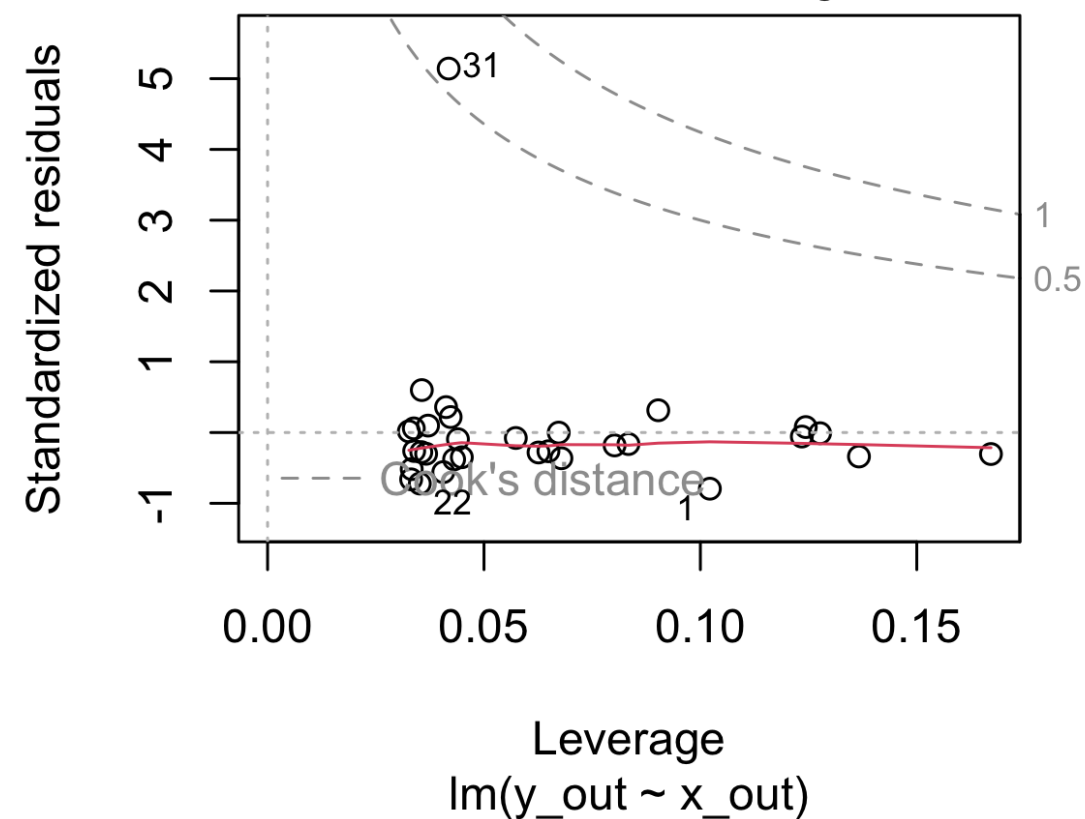
Baseline data

Residuals vs Leverage



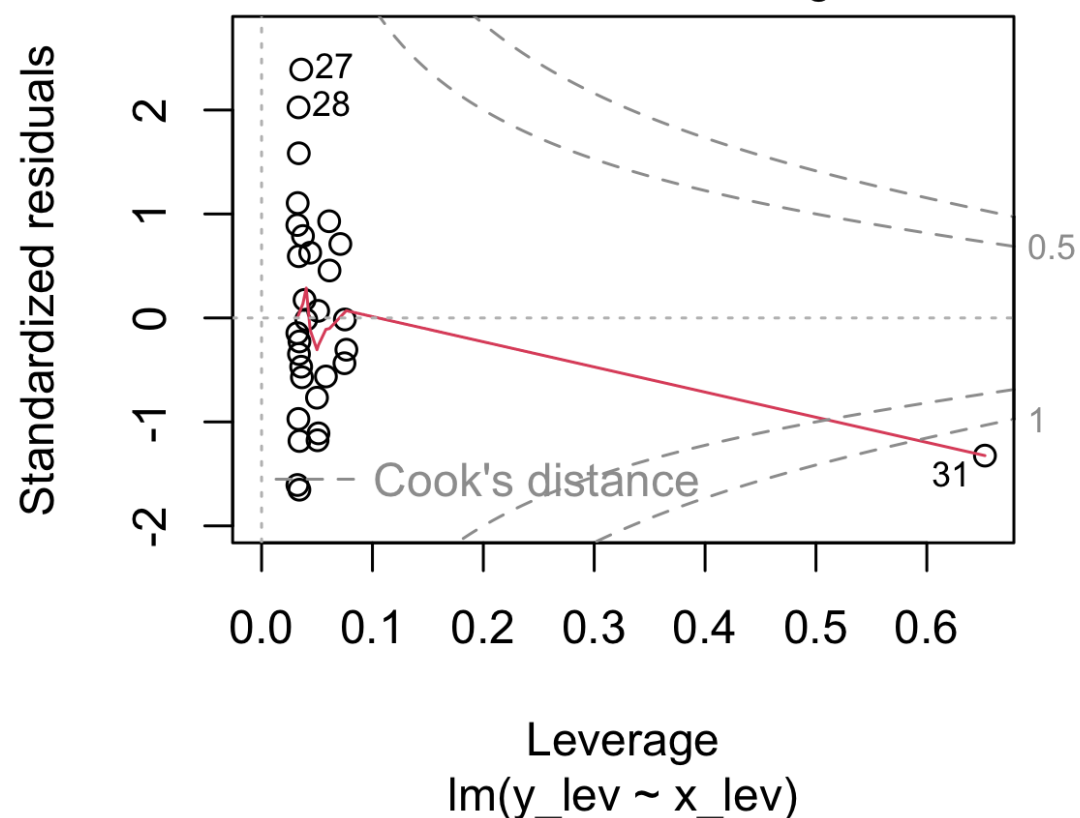
Vertical outlier

Residuals vs Leverage



High leverage

Residuals vs Leverage



Influential point

Residuals vs Leverage

