In class exercise week 9 - Solution
Topic: linear regression

The researcher fitted a simple linear regression with `treated` is the only considered variable explaining the activity of investigated eggs; this yielded the following output:

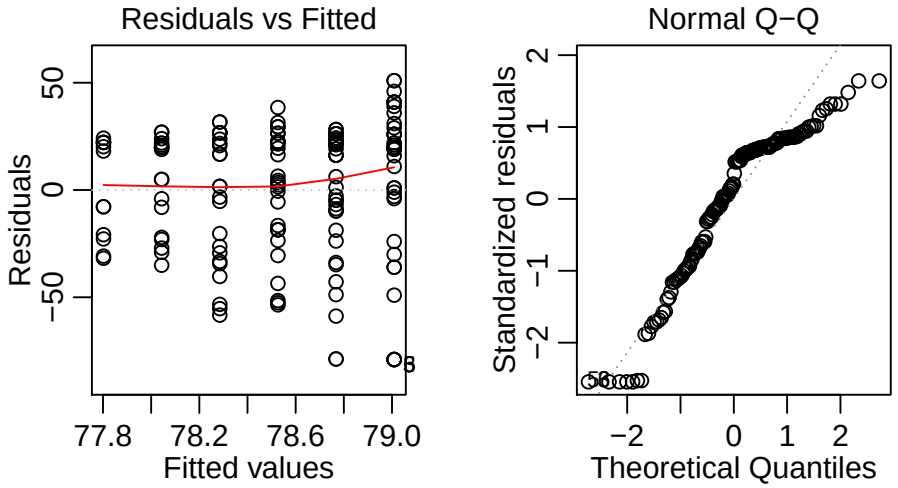
```
Call:
lm(formula = activity ~ treated, data = cricket)

Residuals:
    Min      1Q  Median      3Q     Max
-79.009 -22.233   8.732  22.663  50.991

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  79.7331     8.2626   9.650   <2e-16 ***
treated      -0.2414     1.5993  -0.151     0.88
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 31.3 on 154 degrees of freedom
Multiple R-squared: 0.0001479,        Adjusted R-squared: -0.006345
F-statistic: 0.02278 on 1 and 154 DF,  p-value: 0.8802
```

Suppose that the model assumptions on a linear model are satisfied when answering the following two questions.

i) The fitted linear model is not significantly better than a model which only takes the mean activity of the eggs as prediction on a 5% level.
**X** True ☐ False

ii) The intercept is different of 70 on a significance level of 5%.
☐ True **X** False

We now analyze the residuals. The following three questions refer to them:




iii) The model assumptions on the expectation values of the errors are clearly violated.
☐ True **X** False

iv) The distribution of the residuals has a shorter tail than a normal distribution.
**X** True ☐ False

v) A log-transformation could help to stabilize the variance of the residuals.
**X** True ☐ False