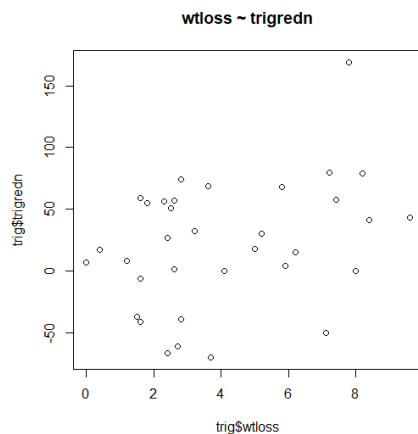# Practical Week 2

Solutions

1. Plot the scatter diagram of reduction in triglyceride against weight-loss, add the regression line and comment.

```
trig <- read_sav
View(trig)
plot(trig$trigredn, wtloss$y1, main = "trigredn ~ wtloss")
```


Carry out the regression of the reduction in triglyceride levels on weight-loss.

```
mod1=lm(trigredn~wtloss,data=trig)
summary(mod1)
```

```
Residuals:
   Min     1Q Median     3Q    Max
-91.51 -27.78   2.84  37.12 122.94

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   -4.638     15.635  -0.297   0.7687
wtloss         6.499      3.226   2.015   0.0524 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 48.8 on 32 degrees of freedom
  (2 observations deleted due to missingness)
Multiple R-squared:  0.1126,     Adjusted R-squared:  0.08484
F-statistic: 4.059 on 1 and 32 DF,  p-value: 0.0524
```

2. How large/small is R-squared?

$R^2 = .113$ is quite low.

3. Is the regression statistically significant?

```
anova(mod1)
```

```
 Analysis of Variance Table

 Response: trigredn
           Df Sum Sq Mean Sq F value Pr(>F)
 wtloss     1   9667  9666.8  4.0591 0.0524 .
 Residuals 32  76208  2381.5
 ---
 Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

$F = 4.059$, p-value = .052. The regression is marginally insignificant.

4. What is the estimate of σ^2?

   Either from ANOVA or Model Summary: $s^2 = 2381.504$ or $s = 48.80066$

5. Write down the regression equation.

   Triglyceride reduction = -4.638+6.499 (Weight-loss)

Tests for Normality

```
mod1 = lm(y ~ x, data=trig)

residual.varname = residuals(mod1)

library(nortest)

lillie.test(residual.varname)

shapiro.test(residual.varname)
```

```
Lilliefors (Kolmogorov-Smirnov) normality test

data:  residual.varname
D = 0.075136, p-value = 0.8966

Shapiro-Wilk normality test

data:  residual.varname
W = 0.97315, p-value = 0.5536
```
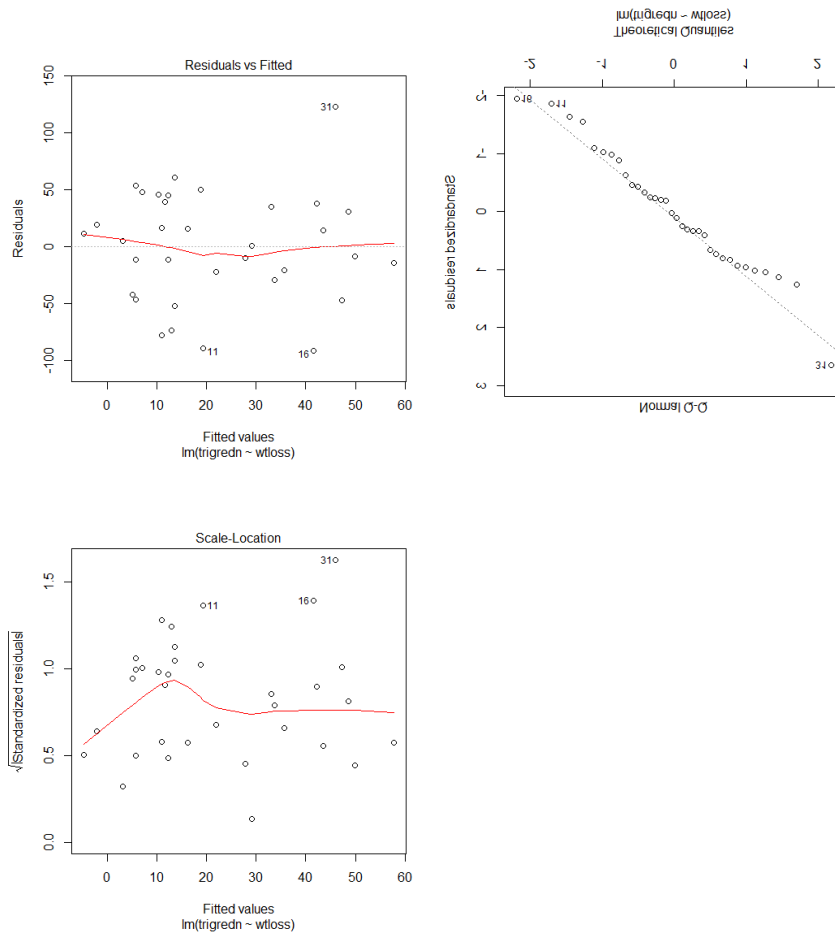
6. Check the validity of assumptions of the regression as described in the lecture.

```
plot(mod1)
Hit <Return> to see next plot:
```

Partial output. See SPSS solutions for detailed comments.