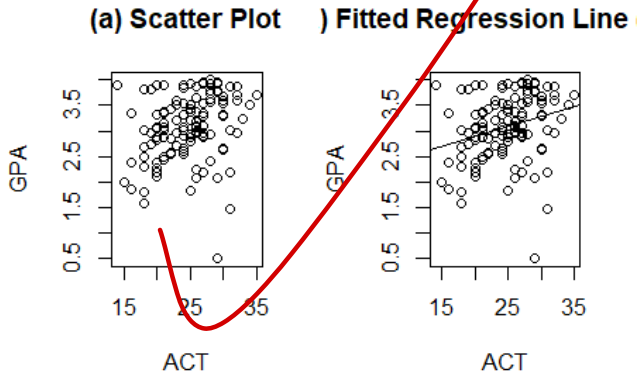
```
> setwd("C:\\Users\\ASUS\\Desktop\\回歸分析\\加分考\\data")
>
Grade_Point_Average=read.csv("Grade_Point_Average.csv")
>
Grade_Point_Average_X=read.csv("Grade_Point_Average_X.csv")
>
Solution_concentration=read.csv("Solution_concentration.csv")
> head(Grade_Point_Average)
   GPA ACT
1 3.897  21
2 3.885  14
3 3.778  28
4 2.540  22
5 3.028  21
6 3.865  31
> #1
> #a
> gpa_lsfit <-
lsfit(Grade_Point_Average$ACT,Grade_Point_Average$GPA)
> b0 <- gpa_lsfit$coefficients[1]
> b0
Intercept
2.114049
> b1 <- gpa_lsfit$coefficients[2]
> b1
```

X
0.03882713
> #b
> par(mfrow = c(1, 2))
>
plot(Grade_Point_Average$ACT,Grade_Point_Average$GPA, main = "(a) Scatter Plot",xlab = "ACT",ylab = "GPA")
>
plot(Grade_Point_Average$ACT,Grade_Point_Average$GPA, main = "(a) Fitted Regression Line (MLE)",xlab = "ACT",ylab = "GPA")
> abline(gpa_lsfit)



> #c
> Y_hat <- b0 + b1 * 30
> Y_hat
Intercept
3.278863

##2
> n <- nrow(Grade_Point_Average)

```
> gpa_lm <- lm(ACT ~ GPA, data =
Grade_Point_Average)
> gpa_lm

Call:
lm(formula = ACT ~ GPA, data = Grade_Point_Average)

Coefficients:
(Intercept)         GPA
     18.98        1.87

> summary(gpa_lm)

Call:
lm(formula = ACT ~ GPA, data = Grade_Point_Average)

Residuals:
   Min      1Q  Median      3Q     Max
-12.242  -3.276   0.218   2.657   9.245

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  18.9754     1.9322   9.821  < 2e-16 ***
GPA           1.8704     0.6153   3.040  0.00292 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 4.325 on 118 degrees of freedom
Multiple R-squared:  0.07262,      Adjusted R-squared:
 0.06476
F-statistic:  9.24 on 1 and 118 DF,  p-value: 0.002917

>
```

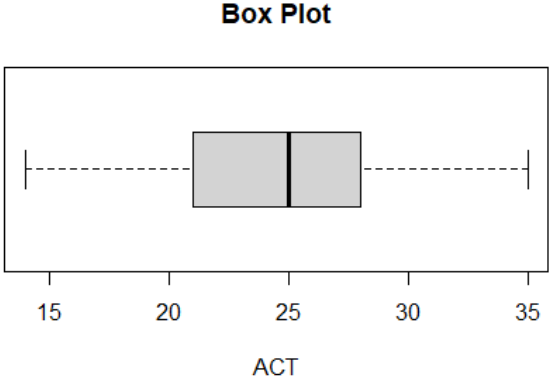
```
> b1 <- summary(gpa_lm)$coefficients[2, 1]
> b1
[1] 1.870353
> sd_b1 <- summary(gpa_lm)$coefficients[2, 2]
> sd_b1
[1] 0.615293
>
>
> alpha <- 0.01
> c(b1 - qt(1 - alpha/2, n - 2) * sd_b1, b1 + qt(1 -
alpha/2, n - 2) * sd_b1 )
[1] 0.259432 3.481274
>
>
> summary(gpa_lm)

Call:
lm(formula = ACT ~ GPA, data = Grade_Point_Average)

Residuals:
   Min     1Q  Median     3Q    Max
-12.242  -3.276   0.218   2.657   9.245

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  18.9754     1.9322   9.821  < 2e-16 ***
GPA           1.8704     0.6153   3.040  0.00292 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 4.325 on 118 degrees of freedom
Multiple R-squared:  0.07262,      Adjusted R-squared:
 0.06476
```

F-statistic: 9.24 on 1 and 118 DF, p-value: 0.002917

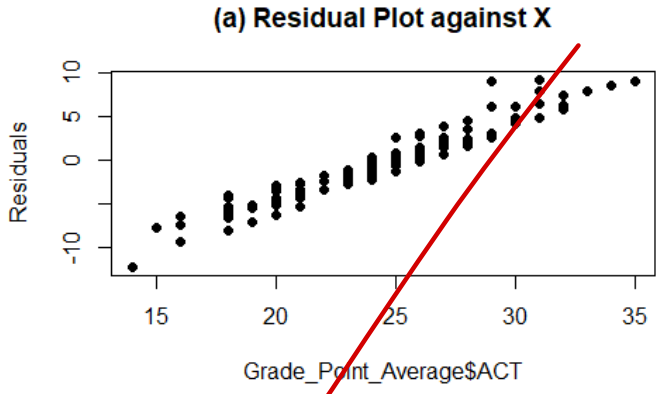
```
> anova(gpa_lm)
Analysis of Variance Table

Response: ACT
          Df  Sum Sq Mean Sq F value   Pr(>F)
GPA        1  172.83 172.831  9.2402 0.002917 **
Residuals 118 2207.09  18.704
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

+10

```
> #3
> boxplot(Grade_Point_Average_X$ACT, xlab =
"ACT", horizontal = TRUE,
+         main = "Box Plot")
```




```
> Residuals <- gpa_lm$residuals
> plot(Grade_Point_Average$ACT,  Residuals, pch = 16,
main = "(a) Residual Plot against X")
```



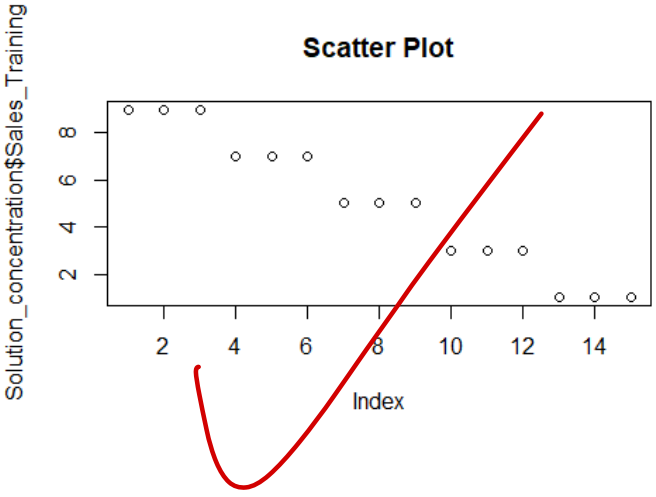
#e

```
> group <- ifelse(Grade_Point_Average$ACT <= 26,
"A", "B")  #ifelse(test, yes, no)
>
>
> library(ALSM)
> bftest(gpa_lm, group)
     t.value   P.Value alpha  df
[1,] 1.404045 0.1629319  0.05 118
```

#4

```
> plot(Solution_concentration$Time_Hours,
Solution_concentration$Sales_Training,
+      main = "Scatter Plot")
```

+5


Scatter Plot
Solution_concentration$Sales_Training
2
4
6
8
2
4
6
8
10
12
14
Index