

```

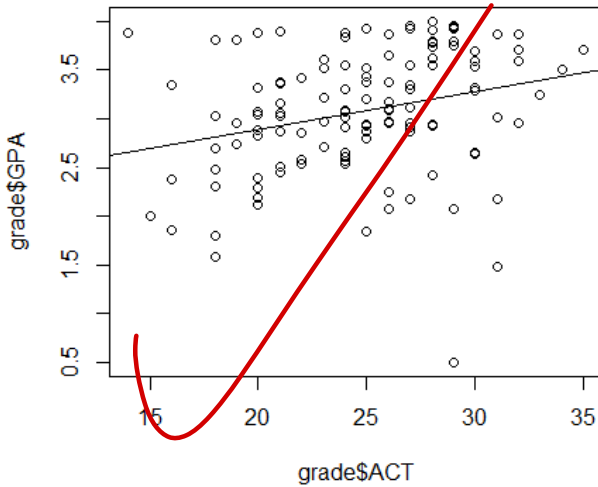
> #1
> #(a)
> grade <- read.csv("data/Grade_Point_Average.csv",header =T)
> lsfit_gpa <- lsfit(grade$ACT,grade$GPA)
> lsfit_gpa$coefficients
Intercept      X
2.11404929 0.03882713
> beta_zero <- lsfit_gpa$coefficients[1]
> beta_one <- lsfit_gpa$coefficients[2]
> beta_zero
Intercept
2.114049
> beta_one
      X
0.03882713
> y_hat <- beta_zero + beta_one * x
> #(b)
> plot(grade$ACT,grade$GPA, main="Grade point average")
> abline(beta_zero,beta_one)

```

55

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**Grade point average**



**Yes**

```

> #(c)
> x = 30
> y_hat <- beta_zero + beta_one * x
> y_hat

```

Intercept  
3.278863  
> #2  
> grade.avg <- read.csv("data/Grade\_Point\_Average.csv")  
> #a  
> avg.lm <- lm(grade.avg\$GPA~grade.avg\$ACT,grade.avg)  
> anova(avg.lm)  
Analysis of Variance Table

Response: grade.avg\$GPA

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
grade.avg\$ACT	1	3.588	3.5878	9.2402	0.002917 **
Residuals	118	45.818	0.3883		

---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
> #b

Alternative:  $\beta_{one} = 0$

Decision rule: If test statistic  $> F_{0.09, n-2}$ , we reject  $H_0$

```
> n <- nrow(grade.avg)
> n-2
[1] 118
```

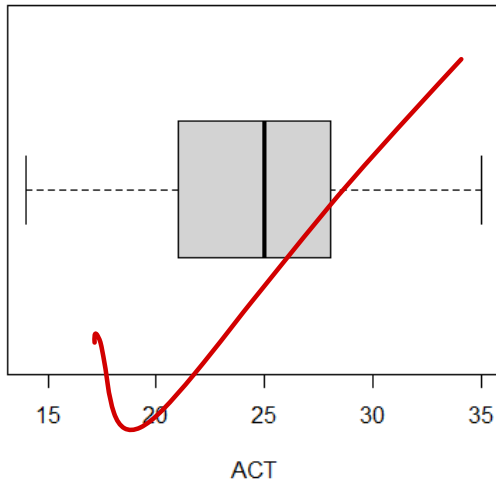
Because p-value  $< 0.01$ , we reject  $H_0$ .

```
> anova(avg.lm)[1,5]
[1] 0.002916604
> #C
>
> summary(avg.lm)$r.squared
[1] 0.07262044
> #3
> #a
> boxplot(grade.avg$ACT, xlab = "ACT", horizontal = TRUE,
+         main = "Box Plot")
```

+20

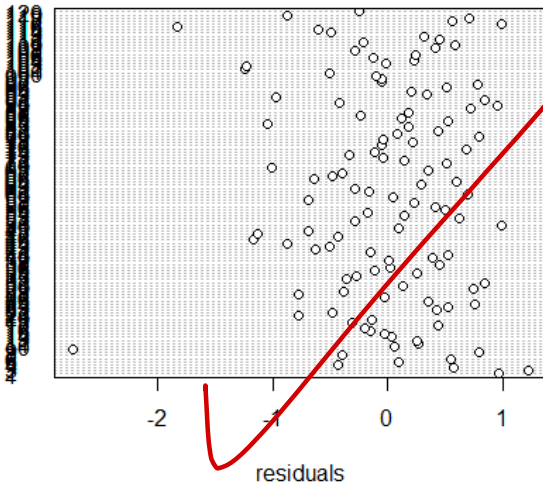
+15

## Box Plot



```
> #B  
> dotchart(avg.lm$residuals, xlab = "residuals", main = " Dot Plot")
```

## Dot Plot



```
> #c
```

```
> plot(grade.avg$ACT, avg.lm$residuals, pch = 16, main = "(a)  
Residual Plot against X")
```

