Homework 4
MTH 4230, Spring 2020
Due Monday, Mar. 2

Chapter in Book	**Problems**
4	4.14*, 4.15**
5	5.5***, 5.13, 5.24 (do part *a*, tasks (1) and (2), and part *c* only)
6	6.2, 6.3, 6.5 (skip parts *e* and *f*), 6.6**** (skip part *c*), 6.7, 6.8*****

* Notice that in **Part *a*** of **Problem 4.14**, you are asked to fit a regression model ***through the origin*** (i.e. the ***no-intercept*** model). For **Part *b***, after fitting the model, typing:

```
> confint(my.reg)
```

will produce the **CI** for the slope. For **Part *c***, the **CI** for the mean response $E(Y_h)$ can be obtained via:

```
> my.new.data <- data.frame(act.score = 30)

> predict(my.reg, newdata = my.new.data, interval = "confidence",
          level = 0.95)
```

** For **Part *c*** of **Problem 4.15**, for the ***lack of fit test***, the **full model** is the one that includes an intercept and the **reduced model** is the one without an intercept. Fit the models by typing:

```
> full.reg <- lm(gpa ~ act.score, data = my.data)
> reduced.reg <- lm(gpa ~ -1 + act.score, data = my.data)
```

Then get the ***F statistic*** for the lack of fit test by typing:

```
> anova(reduced.reg, full.reg)
```

*** For **Problems 5.5**, **5.13**, and **5.24**, matrix multiplication (and vector multiplication) is carried out by the `%*%` operator. The transpose of a matrix is obtained using the `t()` function. The inverse of a matrix is obtained using the `solve()` function.

**** For **Problem 6.6**, **Part *a*** is asking for a ***regression model F test***.

***** In Problem 6.8, you can use the following R code to get the **confidence interval** for a mean response $E(Y_h)$ and the **prediction interval** for $Y_{h(new)}$:

```
> my.reg <- lm(degree ~ moisture + sweetness, data = my.data)
> my.new.data <- data.frame(moisture = 5, sweetness = 4)

> ##  Part a:

> predict(my.reg, newdata=my.new.data, interval = "confidence",
          level = 0.99)

> ##  Part b:

> predict(my.reg, newdata = my.new.data, interval = "prediction",
          level = 0.99)
```