

Homework 6
MTH 4230, Spring 2020
Due Monday, Apr. 6

| Chapter in Book | Problems |
|-----------------|---|
| 8 | 8.3, 8.4*, 8.9**, 8.11, 8.12, 8.15***, 8.19, 8.21 |

* For **Problem 8.4, Parts a and b**, notice that model (8.2) in the book is based on the *centered* predictor variable x , not the original variable X . Thus you should **center** the predictor variable prior to fitting the model:

```
> my.data$CenteredAge <- my.data$Age - mean(my.data$Age)
```

Then you can add the **square** of the (centered) variable x to the data frame:

```
> my.data$CenteredAge2 <- my.data$CenteredAge^2
```

Now you're ready to fit the model:

```
> my.reg <- lm(MuscleMass ~ CenteredAge + CenteredAge2,  
              data = my.data)
```

For **Parts c and d**, to see how to get the *confidence interval for a mean response* and the *prediction interval*, refer to the 5th set of **R Notes for Regression** on the course website.

** For **Problem 8.9, Part a**, you can either make the *conditional effects plot* by hand or in R using something like the following:

```
> curve((25 + 4*3) + (3 + 1.5*3)*x, from = 0, to = 10)
```

```
> curve((25 + 4*6) + (3 + 1.5*6)*x, from = 0, to = 10,  
       add = TRUE)
```

For **Part b**, you can either make the *contour plot* by hand or in R using something like the following:

```
> X1 <- seq(1, 10, 0.2)  
> X2 <- seq(1, 10, 0.2)  
> my.fun <- function(x,y){23 + 3*x + 4*y + 1.5*x*y}  
> Y <- outer(X1, X2, FUN = my.fun)  
> contour(x = X1, y = X2, z = Y)
```

*** For **Problem 8.15**, if you want to, once you read the data from Problems 1.20 and 8.15 into separate data frames **my.data1** and **my.data2**, you can combine them together into a single data frame **my.data** by typing:

```
> my.data <- cbind(my.data1, my.data2)
```