Homework 5

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1.

```
regfit.full = regsubsets(mpg~.-name, data = Auto)
regfit.summary = summary(regfit.full)
# a. the best adjusted R2
which.max(regfit.summary$adjr2)
```

```
## [1] 6
```

The best subset: wicylinders, displacement, horsepower, weight, year, origin

(a)

```
regfit.summary$adjr2[6]
```

```
## [1] 0.8183822
```

The best adjusted R2 is at 6th: 0.8183822

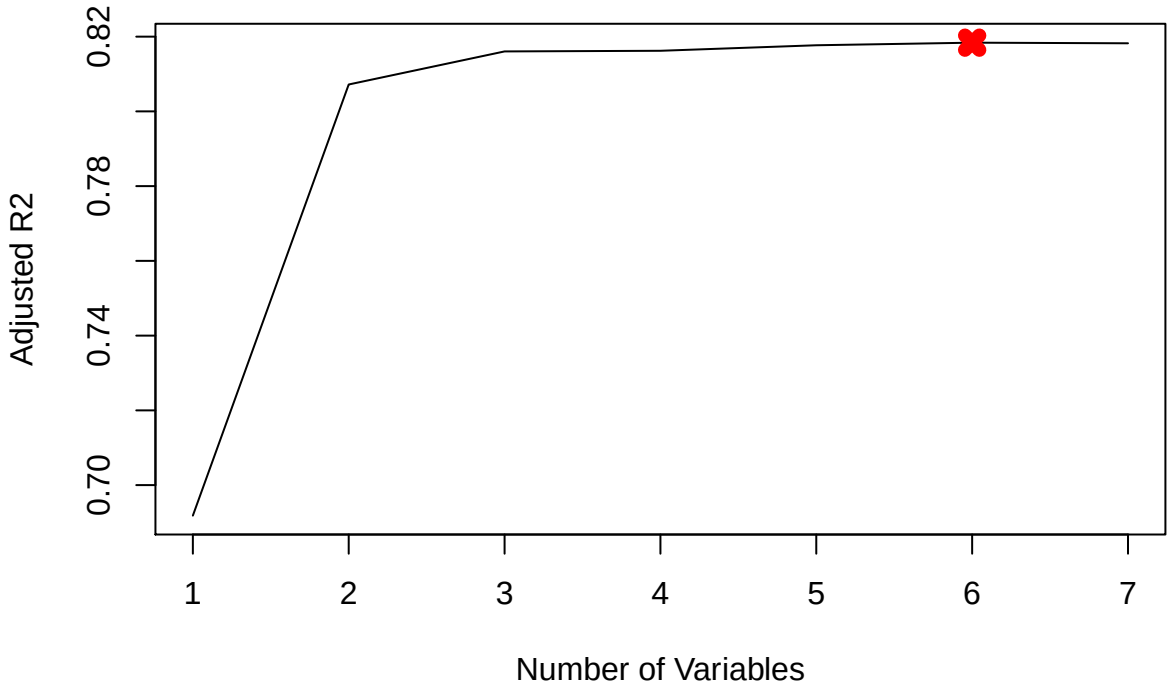
(b)

```
# b. coefficients
coefficients(regfit.full, id = 6)
```

```
##   (Intercept)     cylinders  displacement    horsepower        weight
## -15.563492306  -0.506685137   0.019269286  -0.023895029  -0.006218311
##          year        origin
##   0.747515952   1.428241885
```

(c)

```
# c. Plot of the adjusted R2 as a function of number of variables
plot(regfit.summary$adjr2, xlab = "Number of Variables", ylab = "Adjusted R2", pch = 20,
     type = "l")
points(6, regfit.summary$adjr2[6], pch = 4, col = "red", lwd = 7)
```



2.

```
regfit.fwd=regsubsets(mpg~.-name, data = Auto, method ="forward")
summary(regfit.fwd)
```

```
## Subset selection object
## Call: regsubsets.formula(mpg ~ . - name, data = Auto, method = "forward")
## 7 Variables  (and intercept)
##              Forced in Forced out
## cylinders        FALSE      FALSE
## displacement     FALSE      FALSE
## horsepower       FALSE      FALSE
## weight           FALSE      FALSE
## acceleration     FALSE      FALSE
## year             FALSE      FALSE
## origin           FALSE      FALSE
## 1 subsets of each size up to 7
## Selection Algorithm: forward
##          cylinders displacement horsepower weight acceleration year origin
## 1  ( 1 ) " "       " "          " "        "*"    " "          " "  " "
## 2  ( 1 ) " "       " "          " "        "*"    " "          "*"  " "
## 3  ( 1 ) " "       " "          " "        "*"    " "          "*"  "*"
## 4  ( 1 ) " "       "*"          " "        "*"    " "          "*"  "*"
## 5  ( 1 ) " "       "*"          "*"        "*"    " "          "*"  "*"
## 6  ( 1 ) "*"       "*"          "*"        "*"    " "          "*"  "*"
## 7  ( 1 ) "*"       "*"          "*"        "*"    "*"          "*"  "*"
```

```
regfitFWD.summary = summary(regfit.fwd)
which.max(regfitFWD.summary$adjr2)
```

```
## [1] 6
```

```
regfitFWD.summary$adjr2[6]
```

```
## [1] 0.8183822
```

(d)

It is the same.

(e)

It is the same.

3

```
regfit.bwd=regsubsets(mpg~.-name, data = Auto, method ="backward")
regfitBWD.summary = summary(regfit.bwd)
which.max(regfitBWD.summary$adjr2)
```

```
## [1] 6
```

```
regfitBWD.summary$adjr2[6]
```

```
## [1] 0.8183822
```

It is the same. Both result and Subset.