Ch. 7 Exercise 6

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Part A

```r
library(ISLR)
library(boot)

##
## Attaching package: 'boot'
##
## The following object is masked from 'package:mosaic':
##
##   logit
##
## The following object is masked from 'package:lattice':
##
##   melanoma
##
## The following object is masked from 'package:car':
##
##   logit

all.deltas = rep(1:10)
for (i in 1:10) {
  glm.fit = glm(wage ~ poly(age, i), data = Wage)
  all.deltas[i] = cv.glm(Wage, glm.fit, K = 10)$delta[2]
}
min.point = min(all.deltas)
min.point

## [1] 1593.152

plot(1:10, all.deltas, xlab = "Degree", ylab = "CV error", type = "l", pch = 20, lwd = 2, ylim = c(1590, 1700))
```
fit.1 <- lm(wage-poly(age, 1), data=Wage)
fit.2 <- lm(wage-poly(age, 2), data=Wage)
fit.3 <- lm(wage-poly(age, 3), data=Wage)
fit.4 <- lm(wage-poly(age, 4), data=Wage)
fit.5 <- lm(wage-poly(age, 5), data=Wage)
fit.6 <- lm(wage-poly(age, 6), data=Wage)
fit.7 <- lm(wage-poly(age, 7), data=Wage)
fit.8 <- lm(wage-poly(age, 8), data=Wage)
fit.9 <- lm(wage-poly(age, 9), data=Wage)
fit.10 <- lm(wage-poly(age, 10), data=Wage)
anova(fit.1, fit.2, fit.3, fit.4, fit.5, fit.6, fit.7, fit.8, fit.9, fit.10)

## Analysis of Variance Table
##
## Model 1: wage ~ poly(age, 1)
## Model 2: wage ~ poly(age, 2)
## Model 3: wage ~ poly(age, 3)
## Model 4: wage ~ poly(age, 4)
## Model 5: wage ~ poly(age, 5)
## Model 6: wage ~ poly(age, 6)
## Model 7: wage ~ poly(age, 7)
## Model 8: wage ~ poly(age, 8)
## Model 9: wage ~ poly(age, 9)
## Model 10: wage ~ poly(age, 10)
##
## Res.Df RSS Df Sum of Sq F Pr(>F)
## 1 2998 8022216
## 2 2997 4793430 1 228786 143.7638 < 2.2e-16 ***
## 3 2996 4777674 1 15756 9.9005 0.001669 **
## 4 2995 4771604 1 6070 3.8143 0.050909 .
## 5 2994 4770322 1 1283 0.8059 0.369398
## 6 2993 4766389 1 3932 2.4709 0.116074
## 7 2992 4763834 1 2555 1.6067 0.205199
```r
plot(wage~age, data=Wage, col="darkgrey")
age.lims = range(Wage\$age)
age.grid = seq(from=age.lims[1], to=age.lims[2])
lm.fit = lm(wage~poly(age, 2), data=Wage)
lm.pred = predict(lm.fit, data.frame(age=age.grid))
lines(age.grid, lm.pred, col="blue", lwd=2)
```

Part B