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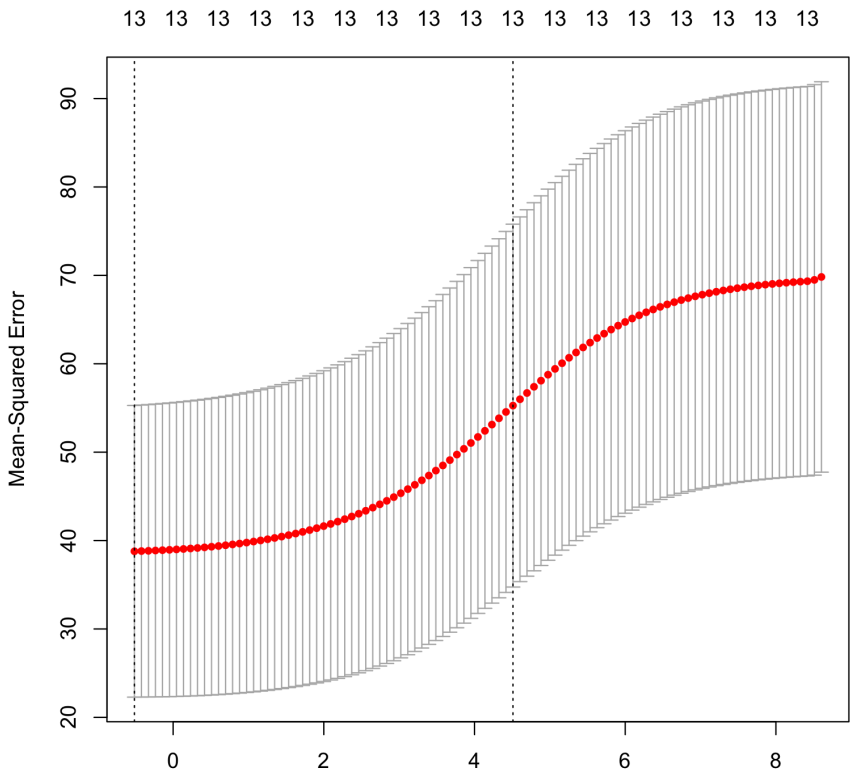
Exercise 6.11

(a)(b)

```
> n
[1] 506
> p
[1] 14

> ridge_error
[1] 46.01686
> lambda
[1] 0.5984109
```

We choose $\lambda = 0.5984$ because if $\lambda = 0.5984$ then $RSS_{\lambda=0.5984} = 46.0186$ is minimum in all RSS_{λ}



R code:

```
data(Boston)
set.seed(105225012)
n = dim(Boston)[1]
```

```r
p = dim(Boston)[2]
id_train <- sample(1:nrow(Boston), nrow(Boston)/2)
train <- Boston[id_train,]
test <- Boston[-id_train,]
xmat.train <- model.matrix(crim~., data=train)[,-1]
xmat.test <- model.matrix(crim~., data=test)[,-1]
ridge_fit <- cv.glmnet(xmat.train, train$crim, alpha=0)

lambda <- ridge_fit$lambda.min # optimal lambda
ridge_pred<- predict(ridge_fit, s=lambda, newx=xmat.test)
ridge_error<- mean((test$crim - ridge_pred)^2) # test error
ridge.pred = predict(ridge_fit, s=lambda, type="coefficients")
```