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setwd("/Users/sgriffin/Documents/GitHub/MultivariateStats/LinAlg HW6/")

df = read.csv("Problems27-28Data.csv")
View(df)
df2 = df[-c(48),] #delete row with outlier
View(df2)

#### Problem 26 ####

attach(df2)
score_regression_0 = lm(Final~., df2, subset = Section == 0)
score_regression_1 = lm(Final~., df2, subset = Section == 1)
score_regression_both = lm(Final~., df2)
score_regression_list =
list(score_regression_0,score_regression_1,score_regression_both)
color_list = list("red","green","blue")
scatterplot = plot(HWGrade,Final,main="HW Grade vs. Final Score", xlab="HW
Grade", ylab="Final Score")
i=1
for (regression in score_regression_list)
{
    abline(regression, col=color_list[[i]])
    i = i + 1
    print(regression)
}

twentysix_b = predict(score_regression, data.frame(HWGrade = 27, Section =
0))
print(twentysix_b)

##### Problem 27 #####

# Designate the two vectors for the dataset
x1 <- c(rep(1,54))
x2 <- c(HWGrade)
x3 <- c(Section)
x <- cbind(x1,x2,x3)
x
x_transposed <- t(x)

xtx <- x_transposed%*%x

#Find inverse of X'X, which is (X'X)^(-1)
xtx_inverse=solve(xtx)

y <- matrix(c(Final))

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y

#Solve for B Matrix

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b <- (xtx_inverse)%*%(x_transposed%*%y)
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b

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std_10 = df2[10,]
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predicted_equation = b[1] + b[2]*std_10[,1] + b[3]*std_10[,2]
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```
print(predicted_equation)
```