DATA 605 - Homework 15

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### Problem 1

Find the equation of the regression line for the given points. Round any final values to the nearest hundredth, if necessary.

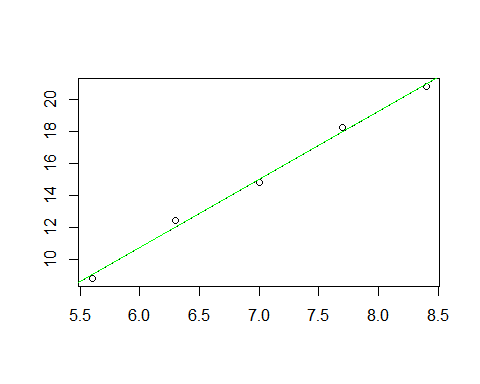
#### SOLUTION 1

x <- c(5.6, 6.3, 7, 7.7, 8.4)  
y <- c(8.8, 12.4, 14.8, 18.2, 20.8)  
r <- lm(y~x)  
r  
##   
## Call:  
## lm(formula = y ~ x)  
##   
## Coefficients:  
## (Intercept) x   
## -14.800 4.257

Based on the linear regression model, the regression line is .

Check with plot.

plot(x,y, xlab="", ylab="")  
abline(r)  
lines(c(5,9), -14.8+4.257\*c(5,9), col="green")



### Problem 2

Find all local maxima, local minima, and saddle points for the function given below. Write your answer(s) in the form . Separate multiple points with a comma.

#### SOLUTION 2

We first need to find the first and second partial derivatives.

When :  .

When :  .

Plugging these values in to get our third coordinate:

-64.

64.

Our two critical points are and .

To classify these extrema, we can use the second derivative test.

.

.

.

.

.

, so both critical points are saddle points.

### Problem 3

A grocery store sells two brands of a product, the “house” brand and a “name” brand. The manager estimates that if she sells the “house” brand for dollars and the “name” brand for dollars, she will be able to sell units of the “house” brand and units of the “name” brand.

Step 1. Find the revenue function . Step 2. What is the revenue if she sells the “house” brand for $2.30 and the “name” brand for $4.10?

#### SOLUTION 3

### Problem 4

A company has a plant in Los Angeles and a plant in Denver. The firm is committed to produce a total of 96 units of a product each week. The total weekly cost is given by , where is the number of units produced in Los Angeles and is the number of units produced in Denver. How many units should be produced in each plant to minimize the total weekly cost?

#### SOLUTION 4

Consider , then .

To find the minimal value consider , then . Then .

### Problem 5

Evaluate the double integral on the given region.

#### SOLUTION 5

There should be 75 units produced in Los Angeles and 21 units produced in Denver.