

Name: \_\_\_\_\_

## Homework Assignment Three

Due Friday, Feb. 4<sup>th</sup>

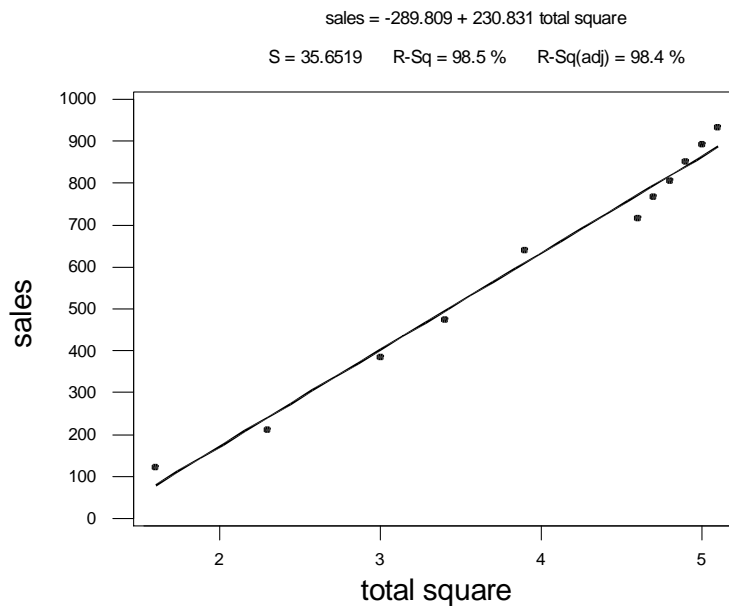
Suggest Reading: Sections 3.2, 3.3

1.) Define the term “least squares method” from section 3.3 in the textbook.

2) For each scatterplot, describe the form, direction, strength and outliers.

a.) This shows the relationship between the total square footage of retail space in shopping malls ( in billions) and their sales ( in billions of US dollars).

### Regression Plot



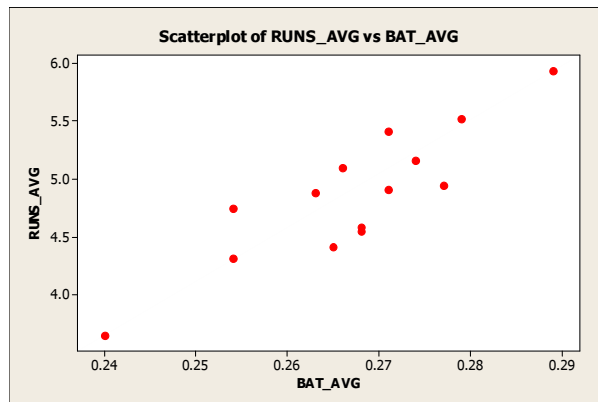
Trend: Linear or Not

Direction:

Strength:

Outliers:

b.) The graph below shows the batting average and the run average for the American League baseball teams in 2003.



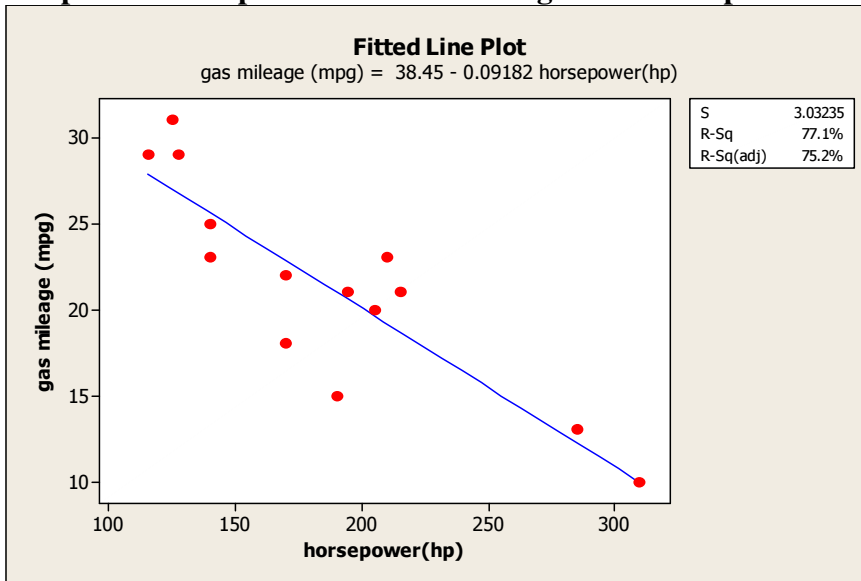
Trend: Linear or Not

Direction:

Strength:

Outliers:

3.) Someone was interested in determining if the horsepower rating of a car could help you predict the fuel efficiency(gas mileage) of a car. They collected some sample data and produced the following Minitab output.



a.) What is the value of slope? \_\_\_\_\_

b.) Interpret slope, if applicable.

c.) What is the value of the y-intercept? \_\_\_\_\_

d.) Interpret the y-intercept, if applicable.

e.) What is the value of  $R^2$ ? \_\_\_\_\_

f.) Interpret  $R^2$ .

g.) Find the value of correlation.

h.) Predict the gas mileage for a car with 170 hp.

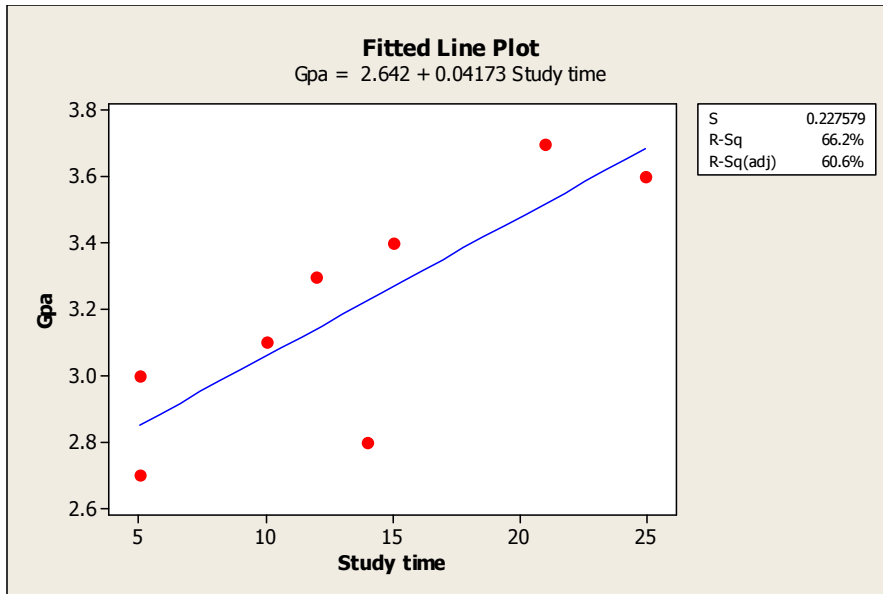
i.) A Toyota Camry has 194 hp with a gas mileage of 21mpg. Find the residual.

4.) Someone was interested in determining if he could predict the gpa of college students based on the number of hours that the students study. He collected some sample data and produced the following Minitab output.

a.) What is the X variable? \_\_\_\_\_

b.) What is the Y variable? \_\_\_\_\_

c.) Describe the following scatterplot.



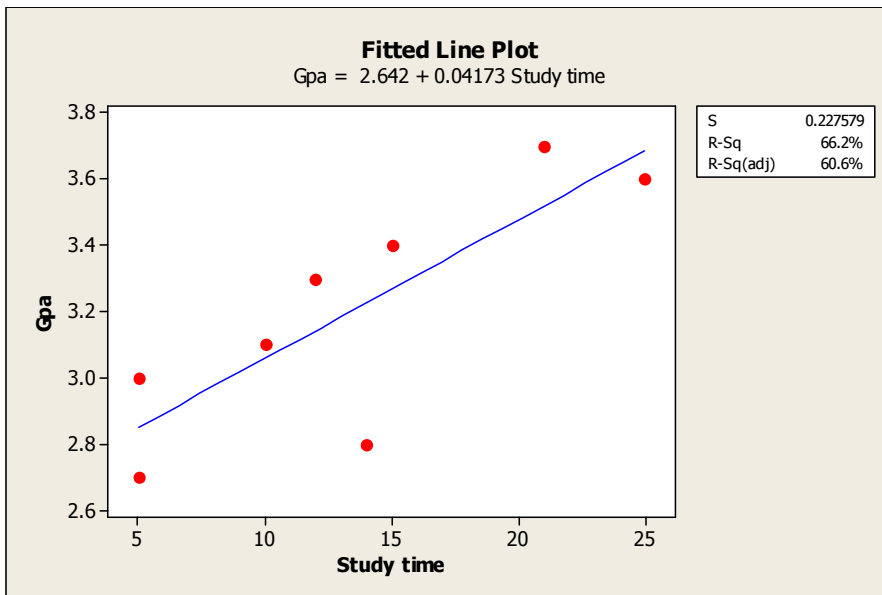
Trend: Linear or Not

Direction:

Strength:

Outliers:

Below is the fitted line plot of the data. Find and interpret each of the terms below.  
**(Notice that the least squares regression equation is given to you under the title “Fitted Line Plot”.)**



- d.) What is the value of  $r$ ? \_\_\_\_\_  
e.) Interpret correlation.

f.) What is the value of the slope? \_\_\_\_\_

g.) Interpret the slope.

h.) What is the value of the y-intercept? \_\_\_\_\_

i.) Interpret the y-intercept.

j.) What is the value of  $R^2$ ? \_\_\_\_\_

k.) Interpret  $R^2$ .

l.) With the regression equation in the previous part, predict the gpa based on 20 hours of study time. Is this reliable?

m.) With the regression equation in the previous part, predict the value of gpa based on 40 hours of study time. Is this reliable?

**5.) Suppose that you were interested in predicting the final exam score based on the midterm score for your Economics 2023 course.**

**r =** 0.70

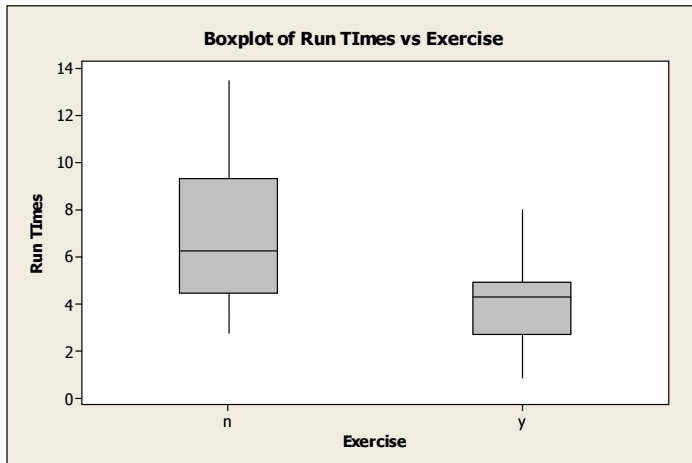
|                  | Mean | Standard Deviation |
|------------------|------|--------------------|
| Midterm Score    | 70   | 10                 |
| Final Exam Score | 72   | 8                  |

a.) Find the slope.

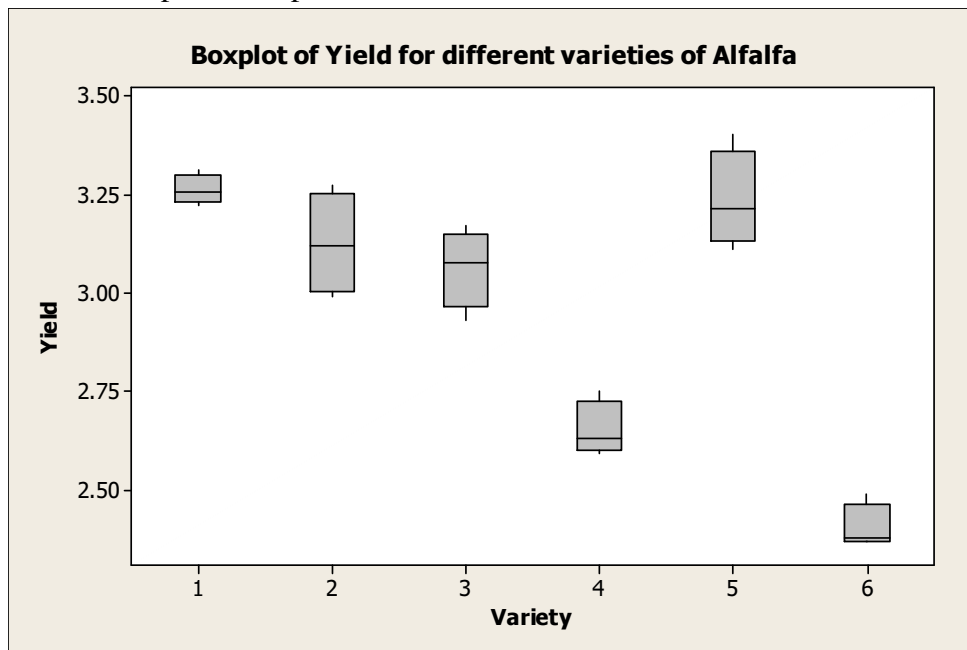
b.) Find the y-intercept.

c.) Find the LSR equation. \_\_\_\_\_

6.) Rats were run through a maze. Twenty five of the rats were given some exercise on a hamster wheel before they went through the maze (marked as y). Another group of 25 rats were not given any exercise before they went through the maze (marked as n). Which group do you think did better? (Hint: It is considered better if you complete the maze in less time.)



7.) The farmer also was interested in seeing what variety of alfalfa grew the best. Below are boxplots of the yields of the varieties of the type of alfalfa. Compare and contrast the center, spread, shape and outliers of the different varieties.



Center

Spread

Shape

Outliers



**8.) Problem 3.11 on page 112**

a.)

b.)

c.)

d.)

**9.) Problem 3.16 on page 113**

1.)

2.)

3.)

4.)

**10.) Problem 3.29 on page 125-126**

a.)

b.)

c.)