

### 3.13: Assignment- Linear Regression

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In this activity we will:

- Find a regression line and plot it on the scatterplot.
- Examine the effect of outliers on the regression line.
- Use the regression line to make predictions and evaluate how reliable these predictions are.

#### Background

The modern Olympic Games have changed dramatically since their inception in 1896. For example, many commentators have remarked on the change in the quality of athletic performances from year to year. Regression will allow us to investigate the change in winning times for one event—the 1,500 meter race.

#### Instructions

Click on the link corresponding to your statistical package to see instructions for completing the activity, and then answer the questions below.

[R](#) | [StatCrunch](#) | [Minitab](#) | [Excel](#) | [TI Calculator](#)

Observe that the form of the relationship between the 1,500 meter race's winning time and the year is linear. The least squares regression line is therefore an appropriate way to summarize the relationship and examine the change in winning times over the course of the last century. We will now find the least squares regression line and plot it on a scatterplot.

#### Instructions

Click on the link corresponding to your statistical package to see instructions for completing the activity, and then answer the questions below.

[R](#) | [StatCrunch](#) | [Minitab](#) | [Excel](#) | [TI Calculator](#)

#### Question 1:

Give the equation for the least squares regression line, and interpret it in context.

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#### Question 2:

Give the equation for this new line and compare it with the line you found for the whole dataset, commenting on the effect of the outlier.

#### Question 3:

Our least squares regression line associates years as an explanatory variable, with times in the 1,500 meter race as the response variable. Use the least squares regression line you found in question 2 to predict the 1,500 meter time in the 2008 Olympic Games in Beijing. Comment on your prediction.

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