



Bookmarks



Bookmark

► Important Pre-Course Survey

► Contact Us

► How To Navigate the Course

► Discussion Board

► Office Hours

► Week 1: Introduction to Data

► Week 2: Univariate Descriptive Statistics

► Week 3: Bivariate Distributions

► Week 4: Bivariate Distributions (Categorical Data)

▼ Week 5: Linear Functions

**Readings**

Reading Check due  
Mar 15, 2016 at 18:00 UTC



Week 5: Linear Functions &gt; Lecture Videos &gt; The Line of Best Fit

## The Line of Best Fit



SPEAKER: MICHAEL J. MAHOMETA, Ph.D.

We've learned that we can actually fit a line - a linear model or function -

to some data.

But how does this actually happen?

How do we decide on a model?



0:00 / 0:00



1.0x



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.srt

## Comprehension Check

1. What is a residual? Select all that apply.

(1/1 point)




the average distance between any data point and the regression line




the difference you get when you subtract a data point from the next closest data point


**Lecture Videos**

Comprehension Check  
due Mar 15, 2016 at  
18:00 UTC 


**R Tutorial Videos****Pre-Lab**


Pre-Lab due Mar 15,  
2016 at 18:00 UTC 


**Lab**

Lab due Mar 15, 2016  
at 18:00 UTC 

**Problem Set**

Problem Set due Mar  
15, 2016 at 18:00 UTC 

☒ the distance between a data point in a scatterplot and the line of best fit 

☒  $e = y - \hat{y}$  

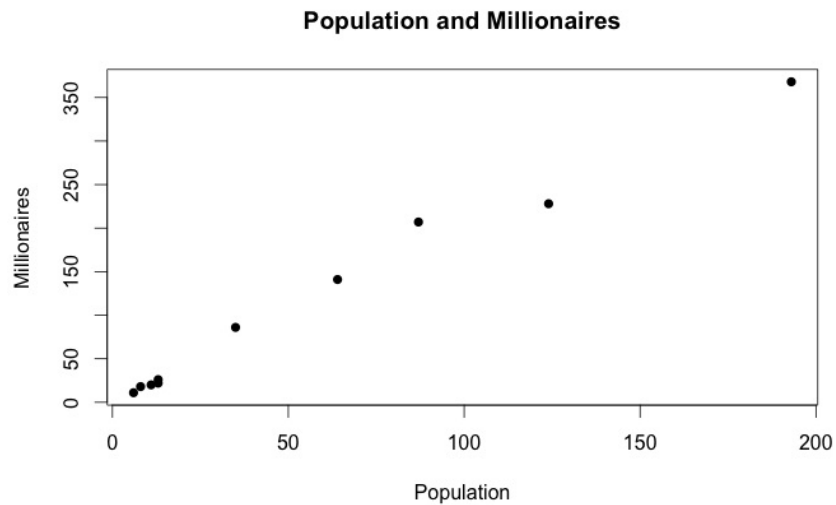


2. Do states with higher populations have more millionaires? Here is data from 2008. The variable labeled "Population" in the table and scatterplot will be referred to as "State.Population" in the questions that follow in order to avoid confusion with the meaning of "population" as a concept in statistics.

State	Millionaires (in thousands)	Population (in hundreds of thousands)
Connecticut	86	35
Delaware	18	8
Maine	22	13
Massachusetts	141	64
New Hampshire	26	13
New Jersey	207	87
New York	368	193
Pennsylvania	228	124
Rhode Island	20	11
Vermont	11	6

Using `linFit()`, the following linear model is found:

$$\text{Millionaires} = 6.296 + (1.921 * \text{State.Population})$$



(2/2 points)

2a. What is the correlation between Millionaires and State.Population?  
(Round to 3 decimal places.)

☐ -0.454

☐ 0.763

☒ 0.992 ✓

☐ 1.921

2b. What is the coefficient of determination? (Round to 3 decimal places.)

☐ 0.015

☐ 0.763

☒ 0.984 ✓

☐ 0.992



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