

Section 4.2 IRA Guide

Introduction

Screen 1: This screen has “Lines” at the top, but I have deleted the problem. **Just move on to screen 2.**

Screen 2: List of Objectives

Screen 3: Example 1 shows how to select two of the points, find an equation based on those points, and then use the equation to predict a value of y for a given value of x .

This is how we would have done things in an algebra class.

We will take a different approach in this class, but you should still watch the video solution so you understand how we will build on this approach.

Screen 4: I have deleted the problem on this screen, so all you will see is a blank screen. **Skip to the next page.**

Objective 1: Find the Least Squares Regression Line and Use the Line to Make Predictions

Screen 1: Definition of a ***Residual***. This is how we will zero in on the line that best fits the data.

Watch the In Other Words video.

Screen 2: Definition of the ***Least-Squares Regression Criterion***, as well as a graphic explanation of what a residual is. Watch the video that is linked in the first paragraph. You can give this page a quick scan – we will make it more concrete on the following screens.

Screen 3: Click the link to open Activity 1. Follow the directions for parts a-c. This will give you a visual interpretation of the least-squares criterion, and give you a chance to see how close you can get to the best fit line using your own intuition.

Screen 4: Introduction of the equation for the least-squares line. We will do all calculations using StatCrunch, so you just need to be familiar with the structure of the equation but not how to compute the slope (b_1) or the intercept (b_0).

Screen 5: The first two key ideas on this screen are very important, and you do not need to worry about the third key idea.

Screen 6: Example 2 shows how to find the regression equation by hand. Again, we will use StatCrunch so you can skip over this.

Screen 7: The first sentence and the last sentence are very important. Be sure to read each problem in the HW carefully as sometimes you will be asked to round to a different number of decimal places. We will use technology (StatCrunch) to find the equation of the least-squares regression line.

Screen 8: Example 3 shows you how to do everything using StatCrunch. We can use StatCrunch to find the equation, to graph the line on the scatterplot, to make predictions, and to find residuals. Watch the StatCrunch video solution.

Screen 9: This problem is based on Example 3 on the previous screen. Click the icon to open the data in StatCrunch, and use StatCrunch for all calculations just like in Example 3.

Objective 2: Interpret the Slope and y-Intercept of the Least-Squares Regression Line

Screen 1: Give the screen a quick read, paying close attention to the two interpretations of the slope at the bottom of the screen.

Screen 2: Pay particular attention to the two scenarios which prevent us from interpreting the intercept – when 0 is not a reasonable value for x or when there are no values of x that are close to 0 in the data set.

Screen 3: In this problem you will make predictions for particular values of x , interpret the slope, and interpret the y -intercept.

Screen 4: When there is no linear relation between the two variables (compare r to Table II) we cannot use the least-squares equation for finding \hat{y} . In this case use the mean of y for all predictions.

Objective 3: Compute the Sum of Squared Residuals

Screen 1: A quick explanation of what the *sum of squared residuals* represents. Give it a quick read.

Screen 2: Example 4 shows how to compute the sum of squared residuals by hand. I will post a video on my YouTube channel that shows how to do this with StatCrunch.

Screen 3: A visual reminder that the least-squares regression equation minimizes the sum of squared residuals.

Screen 4: I have removed this problem – you should see a blank screen here.

Screen 5: End of Section