

Investigating associations between two numerical variables

Tuesday, 26 February 2019 5:55 PM

★ By the end of the lesson I would hope that you have an understanding and be able to apply to questions the following concepts:

- Know what it means by the term **associated**
- Know how to compare data from two numerical variables
- Know how to write a short, concise report about associations
- Remember how to construct and interpret a box plot.

RECAP:

In the previous lessons we have learnt about response and explanatory variables, investigating associations between two categorical variables and investigating associations between a numerical variable and a categorical variable. In this lesson we are going to look at how we can investigate relationships between two numerical variables.

Numerical variable: A variable which takes number values.

Categorical variable: A variable which groups into categories.

The best way to find an association between two numerical variables is to use a scatter plot.

When drawing a scatter plot (which your CAS can help you to do!), you need to ensure you have the response variable and explanatory variable on the correct axis. If you don't get them the right way around, you are going to get an incorrect graph.

Let's draw a scatter plot!

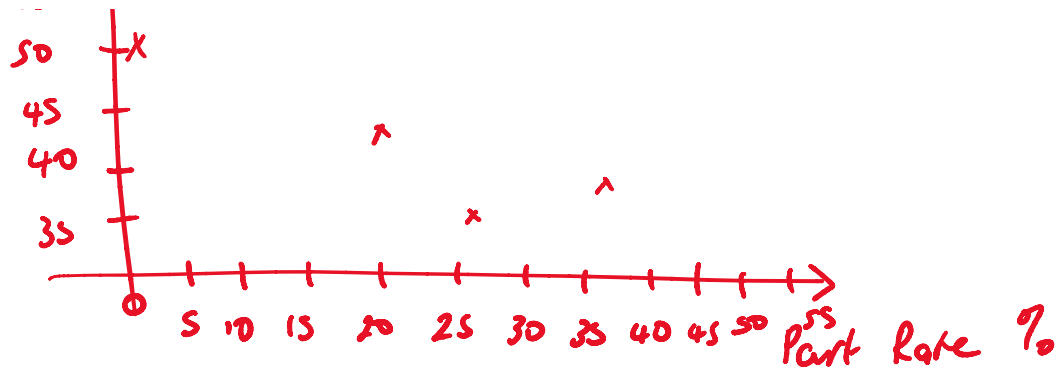
Using data from the Cambridge Further Units 3 and 4 Textbook (with permission) ...

Construct a scatterplot to display average hours worked (the RV) against university participation rate (the EV) in nine countries. The data are shown below.

Participation rate (%)	26	20	36	1	25	9	30	3	55
Hours worked	35	43	38	50	40	50	40	53	35

We can do this the *old fashioned way* ...





Note: The explanatory variable goes on the x-axis.




Note: The response variable goes on the y-axis.

Alternatively, we can use the CAS!

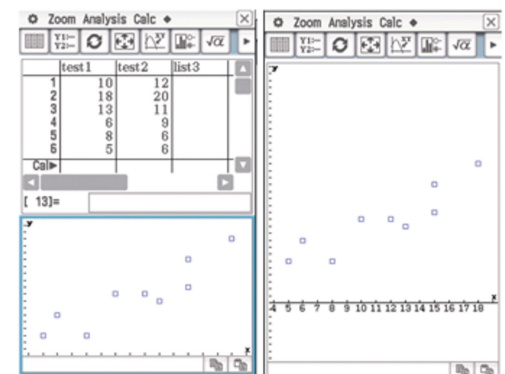
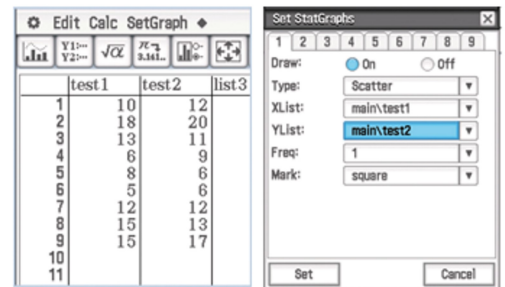
Using the CAS to draw (and interpret) scatter plots is going to rule your life for the rest of this course!



Using a calculator

- 1 Open the **Statistics** application and enter the data into the columns named **test 1** and **test 2**.
- 2 Tap  to open the **Set StatGraphs** dialog box and complete as given below.
 - **Draw:** select **On**.
 - **Type:** select **Scatter** (▼).
 - **XList:** select **main\test 1** (▼).
 - **YList:** select **main\test 2** (▼).
 - **Freq:** leave as 1.
 - **Mark:** leave as **square**.
- 3 Tap  in the toolbar at the top of the screen to plot the scatterplot in the bottom half of the screen.
- 4 To obtain a full-screen plot, tap  from the icon panel.

Note: If you have more than one graph on your screen, tap the data screen, select StatGraph and turn off any unwanted graphs.



Note, in this lesson, we haven't done anything more than draw the scatter plot!

So, how do we now turn the data into something more meaningful, about which we could write a report?