

## Discovering the Correlation Coefficient

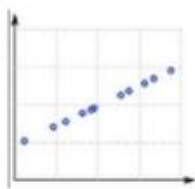
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### Part I: Phet Simulation

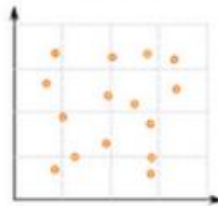
To begin, go to the simulation using this link: [http://phet.colorado.edu/sims/html/least-squares-regression/latest/least-squares-regression\\_en.html](http://phet.colorado.edu/sims/html/least-squares-regression/latest/least-squares-regression_en.html).

On the top drop-down menu, select "Custom." For each of the following scatterplots, try and duplicate the plots on your screen. You can grab data points from the bowl in the bottom left side of your screen. Matching the actual values is not of the greatest importance; you are simply trying to duplicate the arrangement of the points. You will want to pay close attention to when the points are clustered close together or are farther apart.

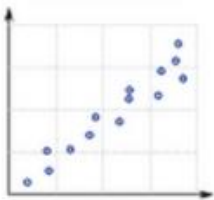
After you have created each plot, click the green plus sign on the left side to reveal the correlation coefficient. Record this value ( $r = ?$ ).



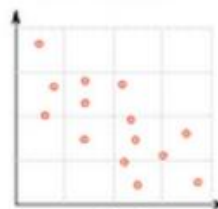
$r =$



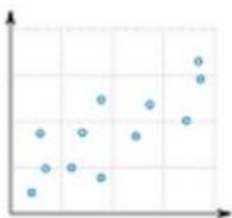
$r =$



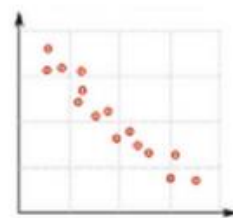
$r =$



$r =$



$r =$



$r =$

Can you construct a scatterplot with a correlation coefficient greater than 1?

Can you construct a scatterplot with a correlation coefficient of 0?

Can you construct a scatterplot with a correlation coefficient less than -1?

## Part II: Analysis

Based on your work in the simulation, answer these analysis questions.

1. Next to each of the graphs, write whether the scatterplot shows a positive, negative, or no correlation.
2. Write a sentence or two summarizing any connections you can note between the r-value and the type of correlation you recorded for question #1.
3. What range can the r-value have?
4. What does an r-value close to positive 1 seem to mean?
5. What does an r-value close negative 1 seem to mean?
6. What does an r-value close to 0 seem to mean?

## Enrichment

7. Construct a scatterplot with 10-20 data points. Estimate the correlation coefficient. How close were you?
8. Create a new plot in the phet simulation using only two points. What is your r-value? Will your r-value always be this number if you have two points? Explain.