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| In this activity, you will investigate a residual plot for a set of data after selecting a regression model. The residual plot is used to justify the choice of a function model based on an analysis of the residuals. |  |
| **Part 1**Use the following data set in Part 1.

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| --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | –1 | 0 | 2 | 5 | 7 | 10 |
| $$y$$ | –7 | –4 | –1 | 6 | 8 | 16 |

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| 1. To enter the data, select … 1: Edit… Enter the *x* values in d and the *y* values in e.
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|  To run a linear regression, select … and use the right arrow to highlight CALC.  Select 4: LinReg (ax + b). Make sure the Xlist: is set to L1 and the Ylist: is set to L2. Arrow down to Store RegEQ: and press ƒr to select 1: Y1. Arrow down to Calculate and press Í. The linear regression is calculated and is also stored in Y1.What is your linear regression equation?  |
| 1. To view the scatter plot, press yo to access STAT PLOTS. Select 1: Plot 1 and press Í. Use the arrow keys to change the settings to match the screen to the right. Select q 9: ZoomStat. **Note:**  To hide the graph of the linear regression equation, select o, use the left arrow key to place it on the = sign and press enter. Select s to view the scatter plot.
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|  The residual is the actual value minus the predicated value. A regression model is justified as appropriate for a data set if the residuals of a regression, the residual plot, appear without pattern. To view the residual plot, press yo and edit the settings of Plot 1 to match the screen to the right. Note: Resid is found by pressing y…. Select q 9: ZoomStat.  Does your residual plot have a pattern? Would a linear regression be appropriate for this data set?  |  |
| 3.To evaluate the predicted values, press ƒr to select 1: Y1. Calculate Y1(–1) and then calculate the residual when x is –1. Calculate Y1(0) and then calculate the residual when x is 0. Notice that one residual value is negative and one is positive. What does this tell us about the predicted value as being an underestimate or an overestimate? **Note:** To view the residual list for all of the data points, select … 1: Edit… . Arrow to the right until you get to L6. Press the Up arrow and then the right arrow. Open the List Editor by selecting y…. Select 7: RESID and press Í. |
| **Part 2**Use the following data set in Part 2.

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| --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | –1 | 0 | 1 | 2 | 4 | 5 |
| $$y$$ | 0.2 | 0.6 | 0.9 | 2.1 | 7.9 | 16.2 |

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| 4. Follow the steps in Part 1. Enter the data in L1 and L2. Compute a linear regression, view the scatter plot, and view the residual plot. Does your residual plot have a pattern? Would a linear regression be appropriate for this data set?  |
| 5. Now compute an exponential regression which is 0: ExpReg in the Stats Calc menu. View the scatter plot, and the residual plot. Does your residual plot have a pattern? Would an exponential regression be appropriate for this data set?  |