

Use the data  $(x_i, y_i)$  below with for questions 1 to 4. Copy all of your answers in a single word-processing document (in addition to your solution to question 5), print that document and turn it in at the beginning of class on the due date. Also include a copy of your Excel spreadsheet. Perform the calculations in Excel using formulas that you enter by hand. You can use the built-in Excel tools to check your work, but the calculations in curve fit should be carried out using a table and formulas that you enter.

<u>x</u> <u>(time)</u>	<u>y</u> <u>(velocity)</u>
10	26
25	52
33	72
42	90
52	100
65	129

- Using Excel, create a scatter plot of velocity versus time. Make a copy of the graph in your word-processing document.
- In your Excel sheet, compute the terms below.
  - $\sum x_i$
  - $\sum y_i$
  - $\sum x_i y_i$
  - $\sum x_i \sum y_i$
  - $(\sum x_i)^2$
  - $\sum x_i^2$
- Using the values from problem 2, above, compute the slope (m) and intercept (b) of the least squares line fit and substitute m and b by their values in the equation  $\hat{y} = mx + b$ . In other words, extend your data table so that it has columns for  $x_i$ ,  $y_i$ , and  $\hat{y}_i$ .
- Compute the  $R^2$  value for the linear curve fit computed in 3.
- The two build-in Arduino functions *setup* and *loop* are passed no arguments and return no arguments and so are declared as *void setup()* and *void loop()*. For a general case, what is the syntax of a user-defined function's declaration?