Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Car Fuel Economy**

**Objectives:**

1. Create a chart of important values
2. Determine what type of graph best fits the available data (exponential, linear, logarithmic, polynomial… etc)
3. Create a plot using the correct values and determine which variable goes on which axis
4. Fit a line to the graph and show equation
5. Use the equation to predict a future value
6. Use the equation editor to display equations
7. Plot on a secondary axis
8. Change the bounds of an axis to take a closer look

**Your task:**

You want to determine whether the curb weight of the vehicle has any impact on the Highway MPG of the vehicle. You also want to find out if there is any relationship between the Highway MPG, curb weight and the cost of the vehicle. Manually input the following information into excel to do an analysis of car fuel economy.

|  |  |  |  |
| --- | --- | --- | --- |
| Car Make and Model | Curb Weight (lbs) | Highway MPG (mi/gal) | Cost of the Vehicle |
| Ford Focus | 2907 | 37 | $17,170 |
| Dodge Charger | 3961 | 31 | $27,995 |
| Subaru Impreza | 2911 | 34 | $18,195 |
| Ford F150 2WD | 5073 | 22 | $23,403 |
| Ford F150 4WD | 5375 | 21 | $32,486 |
| Mazda CX 5 | 3291 | 32 | $21,545 |
| Honda Odyssey | 4470 | 28 | $28,975 |
| Subaru Outback | 3423 | 30 | $24,895 |
| Chevy Equinox | 3777 | 32 | $22,120 |
| Kia Optima Hybrid | 2483 | 40 | $25,990 |

On Excel, record the make, model and year of the vehicle, the curb weight, and the highway MPG (Miles per gallon).

(Please follow the correct homework heading format and please record your answers in blue color on this sheet)

**General note**: Whenever you create a graph, label the X-axis and the Y-axis. Give the graph an appropriate title and include units for the axes. Use the Equation Editor to type answers as equations.

1. Create/insert a scatter plot of the Curb weight (X-axis) vs. Highway MPG (Y-axis).
2. Select the data points and add a linear trendline for the 10 cars you currently have. Make it a **solid green line**.
3. Select to display the equation on the chart. What is the equation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Using your equation, predict the MPG of a Uhaul that has a curb weight of 12,600lbs.
What is that MPG? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Record the Uhaul’s curb weight and predicted MPG on the
excel sheet. Label clearly (linear) and use Equation Editor to show the equation used.
Does that answer make sense? Why or why not? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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5. According to the Uhaul website, a typical truck will get about 10 MPG. Create another scatter plot (do not delete the original one) that shows the same data, but is fitted with an exponential trendline, but don’t include the Uhaul in your second or third graph (**dashed red line**).
6. Select to display the equation on the chart. What is the equation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Using your equation, predict the MPG of a Uhaul that has a curb weight of 12,600lbs.
What is that MPG? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Record the Uhaul’s curb weight and predicted MPG on the excel sheet. Label clearly (exponential) and use Equation Editor to show the equation used.
Does that answer make sense? Why or why not? Is this prediction better or worse than the first equation?

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8. Now create a third scatter plot of curb weight and highway MPG. Add both a linear and exponential trendline. Make the linear trendline a solid green line and the exponential trendline a dashed red line (just like the two previous graphs). Again, don’t include Uhaul here.
9. Now create a 4th scatter plot of Highway MPG and the Cost of the vehicle, both as functions of the curb weight (do not plot the UHAUL).
	1. Select curb weight and highway MPG to plot first.
	2. Right click on the graph and click “select data.”
	3. “Add” a new set of data by selecting curb weight as the x-axis and cost as the y-axis. Name it “Cost”
	4. Plot the data
	5. Right click on the data points and format data series
	6. Select to plot on a secondary axis
	7. Insert an arrow from the insert tab at the top (in “shapes”). Draw it from your curb weight vs MPG data to the proper y-axis. The purpose of this is to show which data set on your graph goes to which axis. Do the same for the Cost data set to the secondary axis on the right. Format the arrow so that it’s the same color as the data set.
	8. Analyze the data. Can you see any trends? What is the relationship between curb weight and MPG? What is the relationship between curb weight and cost? Are there any outliers? What is causing them to be an outlier?

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10. Let’s take a closer look at the graph. Copy the graph by clicking on the 4th graph and press ctrl + C.
	1. Change this 5th graph so that the x-axis is now from 3000 to 4000.
	2. Right click on the x-axis and click format axis”
	3. Change the bounds so that the minimum is 3000 and the maximum is 4000.
	4. This allows me to take a closer look at a specified section of the graph. How many data points do you see here (originally, there were 20)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ data points.
11. Make sure you included a title, legend, arrows and axis labels for all graphs.
12. Organize the excel sheet to make it look presentable.
13. Please make sure you have all the questions answered on this document **and** upload the Excel sheet that you created in the assignment on eCampus.