**Meet in the Middle: Using Systems of Linear Equations**

The Situation:

You live in Houston, Texas and find out that your best friend, Ryan, is moving to El Paso, Texas, which is 745 miles away. Your parents agree that you can spend the summer with Ryan, but they can only drive you about halfway there. Ryan’s parents will have to meet them somewhere in between the two cities, and you are in charge of organizing the details. In planning, you remember that your parents drive 55 miles/hour on average, but that Ryan’s parents typically drive closer to 70 miles/hour. If you and your parents leave on a Saturday at 8 am, at what time and where will both families be in the same place?

The Investigation:

1. Open a new Fathom Document, and create a new collection.
2. Open an empty table from the new collection. Label the first column, “Hours”, the second column “Your\_Family”, and the third column “Ryans\_Family”. In the Hours column, enter in the numbers 1 through 10.
3. For “Your\_Family”, you need to edit the formula for the column to show the speed your family will be driving. To do this, right click the blank box underneath the attribute and select “Edit Formula”.
4. For “Ryans\_Family”, you need to edit the formula to show their travel speed. Remember to include the fact that they will be traveling toward you, and begin 745 miles away!
5. Drag a graph from the toobar, and drag the Hours attribute to the independent variable part of the graph. Grab and drag one of the Family attributes to the dependent part of the graph. To include the other Family attribute on the same graph, drop it over the plus sign on the graph.
6. On your graph, you should see both Your Family’s approach to El Paso, and Ryan’s Family’s approach to Houston.

The Interpretation:

1. What is the point of intersection? (At what time, and how many miles from each city?)
2. What does the slope of each line represent?
3. What kind of system does this graph show?
4. Is there any part of your graph that would not make sense for this situation?
5. Was the meet-up point about the middle distance between the two cities? If not, what could have been changed or adjusted to ensure both families met around the 373 mile mark? How could you adjust the formulas or information in your table or graph to reflect this?

Example:

