

Systems of Linear Equations Group Project

Introduction

Systems of linear equations are a useful way to solve common problems in different areas of life. One of the most powerful ways to use them is in a comparison model where two similar situations are compared side by side to determine which one is better.

In this project your group will be choosing between two real life situations and then using systems of linear equations to decide what to buy. The two situations are:

1. Cell phone plans comparing monthly fee and price per text message.
2. Two cars comparing the base price (the cost of the car) and the cost of driving the car.

You will need to make your selection prior to beginning, so discuss it with your group. Details of the two options are below.

Cell Phone Plans

Situation: You have just graduated from high school and moved away to college. Your parents have decided that it's time for you to pay for your own cell phone. You are a college student so you have to stick to a strict budget. For your cell phone, you have planned to spend no more than \$45 per month. Now you need to determine whether you should go with a plan that costs more per month but charges less per text message or a cheaper plan that charges more per message.

Assignment: You will gather information from Verizon and AT&T, either through their websites or a store location. **NOTE: you cannot purchase unlimited text messaging for this exercise.** You will then

build a system of linear equations for the two plans and use the methods we have been studying to determine which plan is better based on the number of text messages you send per month.

Car Comparison

Situation: You just got your first job and have decided that it's time to buy a car. You've narrowed it down to either the Chevy Camaro or the Toyota Prius. The Prius cost a bit more but gets better gas mileage so will cost less to drive per month. You need to determine how long it will take until you've spent more on the Camaro than you would have on the Prius to make your decision.

Assignment: You will gather information (price of the car and the miles per gallon) for each of the cars. Then you will build a system of linear equations to determine which will be the better buy.

Project Details

Today you will decide which project your group wants to do. If you wish to change the cars or alter the cell phone project talk to me and we will see what we can do. After you decide on a project your group will need to designate the following roles in the group:

1. **Data Chief**—Responsible for collecting the data and building a word problem. I suggest that this person have easy access to the internet (either at home or a nearby library).
2. **Head Architect**—Responsible for building the system of linear equations once the data has been collected.
3. **Master Analyst**—Responsible for using the methods we have been studying (graphing, substitution, and elimination) to find the solution to the system built by the Head Architect.
4. **Lead Designer**—Responsible for designing the final display of the project. Possibilities are posters, kiosks, PowerPoint, or formal mathematical report. Although the Lead Designer is responsible for the design, all group members must contribute to the actual work of creating it.

NOTE: These are responsibilities and must be taken seriously. The project depends upon certain tasks being completed on time and in order so everyone must do their part. You will be graded as a group and as individuals so everyone must participate.

Also, just because one person has the responsibility doesn't mean that they will work alone. You should all help one another and check each other's work. Again, this is a group project and one bad part will affect everyone's grade.

Project Timeline

Today	Choose project and assign roles.
Tuesday, February 2	Data is Due
Wednesday, February 3	System of Linear Equations is Due
Thursday, February 4	Solution to the System is Due
Friday, February 12	Entire Project Due (Presentation and Word Problem)

Grading

The grading will be broken down as follows:

Individual Portion 20%

Group 80%

Conclusion

Hopefully this will be an interesting application of what we have been studying the past few weeks and will help you see how math can be used for a "real life" situation. In order to complete the project every group member must participate and do their share. If you need help with any portion of the project, either individually or as a group, I am here to help. This is a learning experience so please ask questions as needed.