Name_____ Per_____
Int.2 Ch.3 Systems Project Part 1 (40pts)
Due Date: R/F October 7/8

I.   A.   Describe how to use the following methods for solving systems of linear equations:
                1. Graphing
                        a. List the criteria for the using this method?   _____(2pts)

                        b. List the strengths of this method?   _____(1pt)

                        c. List the weaknesses of this method?   _____(1pt)

                        d. Write the algorithm in words for this method along side an example.   _____(4pts)

                2. Substitution
                        a. List the criteria for the using this method?   _____(2pts)

                        b. List the strengths of this method?   _____(1pt)

                        c. List the weaknesses of this method?   _____(1pt)

                        d. Write the algorithm in words for this method along side an example.   _____(4pts)

                3. Elimination by addition or subtraction
                        a. List the criteria for the using this method?   _____(2pts)

                        b. List the strengths of this method?   _____(1pt)

                        c. List the weaknesses of this method?   _____(1pt)

                        d. Write the algorithm in words for this method along side an example.   _____(4pts)

                4. Elimination with multiplication
                        a. List the criteria for the using this method?   _____(2pts)

                        b. List the strengths of this method?   _____(1pt)

                        c. List the weaknesses of this method?   _____(1pt)

                        d. Write the algorithm in words for this method along side an example.   _____(4pts)

        B.   Finding Solutions
                1. How can you tell from a graph how many solutions a system has?   _____(3pts)

                2. How can you tell from the equations without solving, how many solutions _____(3pts)
                   a system of equations will have?

                3. Give an example of each.   _____(2pts)

Name_____   Per_____
Int.2 Ch.3 Systems Project Part 2 (60pts)
Due Date: R/F October 14/15

II.   Complete the following Telephone Service problem.

Telephone service

Your telephone company offers three calling plans for local telephones service. The choices differ according to their monthly charges, and the costs of various calls. The telephone directory provides the following table of information.

Basic service $24.80/month	Basic plus plan $42.60/month	Unlimited $84.95/month
In addition to the monthly rate, all long distance calls made are charged on a per-minute basis of 11.6 cents per minute.	With the monthly rate, local long distance (in-state) calls are included. However, state-to-state calls are charged 8.3 cents per-minute.	This plan includes unlimited calling to all local, in-state, and state-to-state numbers.

   A. Prepare a guide that shows the advantages and disadvantages of the 3 calling plans.
       Be sure to include the following elements:

   1. Graph #1 - Show the cost of each of the three plans as a function of the amount of calling time, assuming that all calls are made in-state. Give an accurate mathematical interpretation of this graph that would help someone who calls only in-state select the least costly plan. (10pts)

   2. Graph #2 - Show the cost of each of the three plans as a function of the amount of calling time, assuming that all calls are made out-of-state. Give an accurate mathematical interpretation of this graph that would help someone who calls only out-of-state select the least costly plan. (10pts)

   3. Graph #3 - Show the cost of each of the three plans as a function of the amount of calling time, assuming that calls are made in both times zones. Assume that you average 20 minutes per day for a 30-day month. Give an accurate mathematical interpretation of this graph to help people select the least costly plan. (Hint: How would you find the total number of minutes? Let x be the number of in-state minutes; how would you represent the total number of minutes out-of-state? How would you represent the total cost of each plan?) (10pts)

   4. A detailed description of what kinds of telephone users would benefit from choosing each of the three plans. Be sure to include people who call both zones. **Give as many specific details as possible (example: the calling levels at which there is a change in the choice of the best plan).** (10pts)

B. Which kind of local telephone service would you recommend for each of these residents of your hometown? Give the reasons behind your advice. If you would need to know more information before making your recommendation, explain which additional things you would like to know. (You MUST make a recommendation for each scenario even if more information is needed. In cases where more information is needed you MAY need to make more than one recommendation. Mathematically justify the conditions for each recommendation if more than one recommendation is needed.) (15pts)

1. *Andy: "I keep careful track of my calls because I'm interested in saving money. Last month I made 67 calls within the state, totaling 10 hours and 40 minutes, and 21 calls outside the state, totaling 90 minutes."*

2. *Barbara: "I talk on the phone for an average of 20 minutes per day. Usually when I get home at night, I call up my two best friends, who live in Greeley and Milliken."*

3. *Chris: "My parents are always telling me to get off the phone. I like to talk to all my friends from Cheyenne East High School. I don't think they ever call anyone outside of town because I never give them the chance."*

4. *Douglas: "I run a national business from my home. I spend about 20 minutes per day on the phone with clients."*

5. *Eleanor: "I don't really make very many calls. I have to talk to people all day at work. When I get home, I like my privacy; I do need to order Chinese food once in a while. On Sundays I call my mother in Granby."*

6. *Francisco: "I just moved here from Orange County, CA. I always keep in touch with my friends there, talking about a half-hour most nights. I don't really know anyone here in town."*

7. *Gerry: "I never talk on the phone. I only use it for the internet. I am on that <u>all</u> the time!"*

C. You receive a call from a disappointed Francisco: "I don't understand. I switched my plan from basic to basic plus. I thought I would save some money because I make lots of calls. I just got my new bill, and not only is there an increased monthly charge, but my per-call charges have actually increased. My bill went from $60 up to $70!" Explain to Francisco the reason for this unexpected increase. (5pts)

III. **Bonus**: Design and make a brochure for the telephone company to explain the 3 plans to its customers. It must include the graphs and explanations of which plan fits which types of callers. (Maximum15pts)

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