

MATHEMATICAL JOURNAL
WEEK 2

1. The table at the right shows the year and the corresponding fare charged to ride the subway in New York City.

Year	Fare
1953	\$ 0.15
1970	\$ 0.30
1975	\$ 0.50
1984	\$ 0.90
1990	\$ 1.15

- a. What are the independent and dependent variables?
 - b. Draw a scatter plot for this data on a sheet of graph paper.
 - c. Draw the best fit line for this data. What is the equation of the best fit line according to the calculator?
 - d. What type of correlation exists?
(strong positive, weak negative, etc.)
 - e. According to your best fit line, what was the price of a subway fare in NYC in 1981?
 - f. According to your best fit line, predict what the price was in 2000?
2. Greg Louganis dives off the high diving board. His distance from the surface of the water varies quadratically with the number of seconds that have passed since he left the board. His distances at times 1, 2, and 3 seconds since he left the diving board are 24, 18, and 2 meters above the water respectively.
- a. Assuming that the distance above the water is a quadratic function of time, write the three ordered pairs given in the problem.
 - b. Write the particular equation expressing distance in terms of time.
 - c. How high is the diving board? Justify your answer.
 - d. What is the highest Greg gets above the water?
 - e. When does Greg enter the water?
 - f. At what height above the water is Greg when he is 1.5 seconds into his dive?

3. Solve the following system of equations.
- $$x^2 + 2y^2 = 10$$
- $$3x^2 - y^2 + 16 = 0$$

4. The Addams Family are planning to rent a midsize car for a one-day trip. In the standard rental plan, they can rent a car for \$52 per day plus 23 cents per mile. In the deluxe rental plan, they can rent a car for \$80 per day with unlimited mileage.
- a. For each plan, write an equation that represents the cost of renting a car.
 - b. Graph the equations. Estimate the break-even point of the rental costs.
 - c. If the Addams Family plans to drive 150 miles to visit relatives in Death Valley, which plan should they use?

5. During today's session, we used the calculator to look at mathematical modeling with real world data. We discussed regression, and the use of the correlation coefficient to judge the accuracy of the regression. Reflect on this or any other activity thus far. What parts of the activity did you enjoy the most? What did you learn that was new to you? Have you used the graphing handhelds to discuss this concept with students? How has it worked for you? Was there anything difficult that you would change? Is there anything you would like to learn more about? Is this something that would be applicable to your classroom?