**Advanced Algebra**

**Group Problems**

Jen and Priya decide to go out to lunch. The each have a 50-cent off coupon for the Super-Duper-Deluxe meal that is normally $5.49. In addition, if they show their student I.D.s, they get an additional 10% discount. Jen’s server rang up her order as meal, coupon, and then ID discount. Priya’s server rang it up as Meal, ID discount, and then coupon.

1. How much did each student pay?
2. Write a function, C(x), that will deduct 50 cents from price, x
3. Write a function, D(x), that will take 10% off a price, x.
4. Find C(D(x)) and D(C(x))
5. Who’s server used C(D(x)) to calculate the price of the meal?
6. Is there a price for the meal that would result in both students paying the same price?

The Acme Bus Company has a daily ridership of 18,000 passengers and charges $1.00 per ride. The company wants to raise the fare yet keep its revenue as large as possible (revenue is found by multiplying the number of passengers by the fare charged). From previous fare increases, the company estimates that for each increase of $0.10, they will lose 1000 riders.

1. Create a table of fare (x) and revenue (y) for fares starting at $1.00 and going up to $2.00
2. Make a graph of the revenue versus far charged.
3. What are the coordinates of the vertex of the parabola? Explain the meaning of each coordinate of the vertex
4. Find a quadratic function that models this data. Use your model to find:
   1. The revenue if the fare is $2.50
   2. The fare(s) that make no revenue ($0)

