Group Quiz

Organize yourselves into groups with no more than three people (individuals are ok). Work on the following questions together and turn in *one* completed quiz for the group. Make sure all of your names are on the quiz.

You are welcome to use any material in the classroom that you have *except* the internet. Show *all* your work for each and simplify. No credit is given without supporting work.

1. [7] An ice cream company finds that at a price of $4.00, demand is 4000 units. For every $0.25 decrease in price, demand increases by 200 units. Use calculus to find the price and quantity sold that maximize revenue.

2. A truck has a minimum speed of 9 mph in high gear. When traveling x mph, the truck burns diesel fuel at the rate of

$$0.003935 \left(\frac{675}{x} + x \right) \frac{\text{gal}}{\text{mile}}$$

Assume that the truck cannot be driven over 63 mph and that diesel fuel costs $1.44 a gallon.

(a) [3] Find the total cost of a 570 mile trip as a function of x.

(b) [4] Find the total cost of a 570 mile trip if the driver is paid $13 an hour as a function of x.

(c) [6] Use calculus and part (b) to find the steady speed that will minimize the total cost of the trip if the driver is paid $13 an hour.