1. (40 pts) In an attempt to cling to his joyful college days, Jerry consumes only cold cereal (C) and hot "so good your knees buckle" soup (S) from down the street. Thanks to the law of diminishing returns, his marginal rate of substitution ($MRS = MU_S/MU_C$) between the two is 2C/S. [In this context, the MRS is the amount of cereal he must give up to stay indifferent if he is given an additional serving of soup. For example, if Jerry consumes 4 cereals and 2 soups, he is willing to give up 4 cereals (2*4/2) to get 1 additional soup.] Cereal costs $2 per serving ($P_C = 2$), while soup costs Jerry $8 per serving ($P_S = 8$).

   A. Does the trade-off implied by the MRS strike you as reasonable? (Consider when Jerry has a lot of soup but little cereal and conversely.) Why or why not?

   B. What is the relative price of soup in terms of cereal (i.e., how much cereal must Jerry give up to get one more serving of soup)?

   C. Is this enough information to find Jerry's consumption of soup and cereal? What can you say about his Jerry's expenditures on soup compared to his expenditures on cereal? About his consumption of soup compared to his consumption of cereal?

   D. Now suppose that Jerry's income is $60. Graph Jerry's budget constraint. Be sure to label the budget line's endpoints.

   E. Assume that Jerry spends all of his income on soup and cereal. Express Jerry's cereal consumption in terms of his income, the prices he faces, and his soup consumption.

   F. At what level of soup and cereal consumption does Jerry maximize his utility? Draw an indifference curve that is consistent with the above MRS and that yields this outcome.

In an unintentionally socially beneficial act, Elaine discovers and distributes all the soup recipes. With the increased number of soup suppliers, the price of soup falls to $4 per serving.

   G. Graph Jerry's old and new budget constraints (assume that the price of cereal and his income are unchanged). Draw two plausible indifference curves that appropriately intersect those budget constraints.

   H. Clearly identify the income effect and substitution effect (in Jerry's soup consumption) of this price decrease. Given your graph, is soup a normal or inferior good? What about cereal?

2. (15 pts) Health Harry's Juice Bar has the following cost schedules:

Q (vats)	Variable Cost	Total Cost
0	$ 0	$ 30
1	10	40
2	25	55
3	45	75
4	70	100
5	100	130
6	135	165

A. Calculate average variable cost, average total cost, and marginal cost for each quantity.

B. Graph all three curves. What is the relationship between the marginal-cost curve and the average-total-cost curve? Between the marginal cost curve and the average variable cost curve? Explain.

3. (35 points) A future recession greatly affects the daily market demand for Maine lobsters, which can be described as $Q^D = 3000 + 250I – 250P$ (I is the average American income in $1000s). Thanks to the recession, that average income falls from $32,000 to $24,000. All lobster fisherman are identical and face the same relationship between their total daily costs and daily output (q): $TC = ½*q^2 + 4q + 200$, which yields a marginal cost of $MC = q + 4$. You should assume that market output is the sum of all firm output ($Q = N*q$, where N is the number of lobster fishermen). Use this information to answer the following questions.

A. How large are each fisherman's fixed costs?

B. Graph the pre-recession and post-recession demands for lobster. In the short-run, what happens to the price of lobster?

C. What is the efficient scale (i.e., at what q are average total costs minimized) for lobster fishermen?

D. Before the recession, there were 250 lobster fishermen. Was the industry in long-run equilibrium? Find that scenario's market price, total output, each firm's output, and each firm's profits.

E. After the recession, the 250 lobster fishermen continue to go out and fish. What is each fisherman's profit-maximizing output now? Find the market price and the total output. How large of a loss are the fishermen incurring? In the short-run, will these fishermen continue to operate or shut down (i.e., leave their boats idle at the dock)?

F. In the long run, fishermen can sell their boats and find other work. What happens to the short-run supply curve when this occurs? This will continue until what point?

G. Find the long-run equilibrium number of fishermen in the post-recession market for lobsters. How many fishermen had to exit?