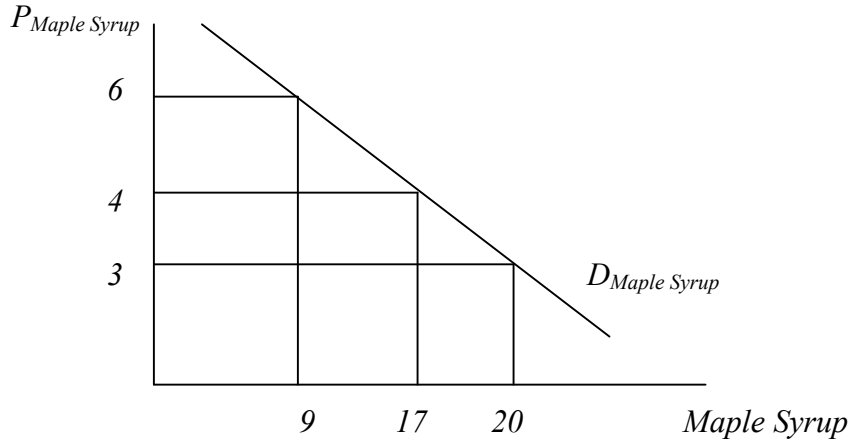
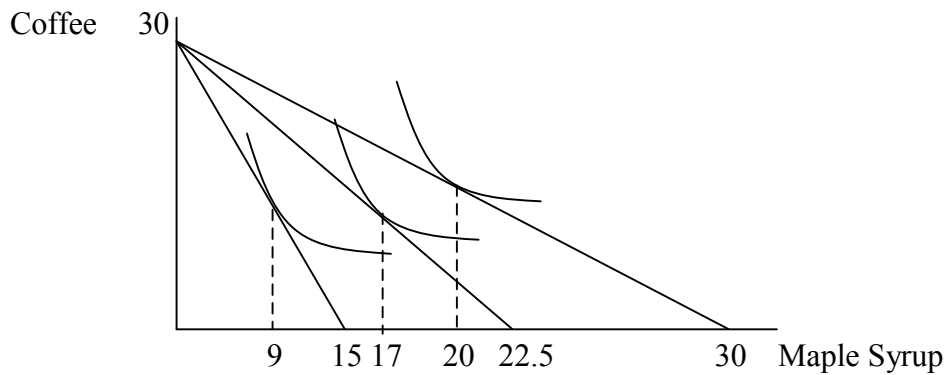


Clearly label all graphs for full credit and please write legibly; I cannot grade what I cannot read.

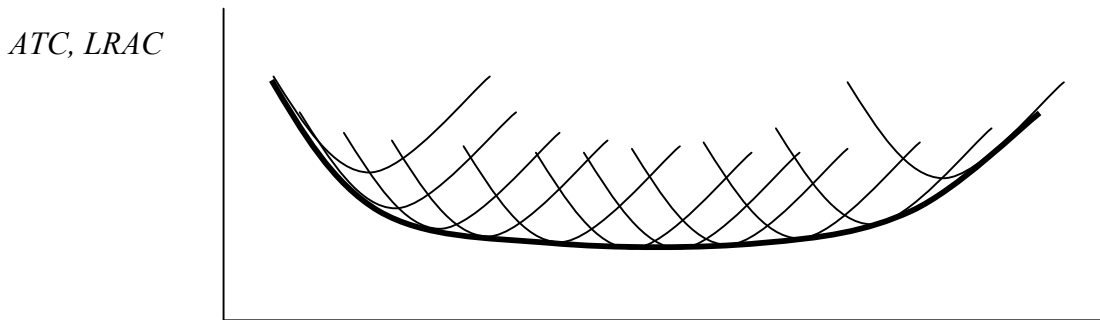
Number of points each question is worth in parentheses.

1. (6) Suppose you consume two goods, cups of coffee and bottles of maple syrup, the price of coffee is \$3 and your income is \$90. Given the following indifference curve diagram, draw your demand curve for Maple Syrup below.



2. (6) Ceteris paribus, goods that are _____ and goods that take up a _____ proportion of your budget tend to have more elastic demand.
- normal; larger**
 - normal; smaller
 - inferior; larger
 - inferior; smaller

3. (6) Increasing Marginal Returns is responsible for _____ Marginal Product and _____ Marginal cost.
- increasing; increasing
 - increasing; decreasing**
 - decreasing; increasing
 - decreasing; decreasing
4. (6) A firm should shut down if its total revenue does not exceed _____.
- marginal cost
 - fixed cost
 - variable cost**
 - total cost
5. (6) Explain (verbally and using a graphical demonstration as part of your answer) how it is that a firm's Long Run Average Cost curve is created using short run Average Total Cost curves.

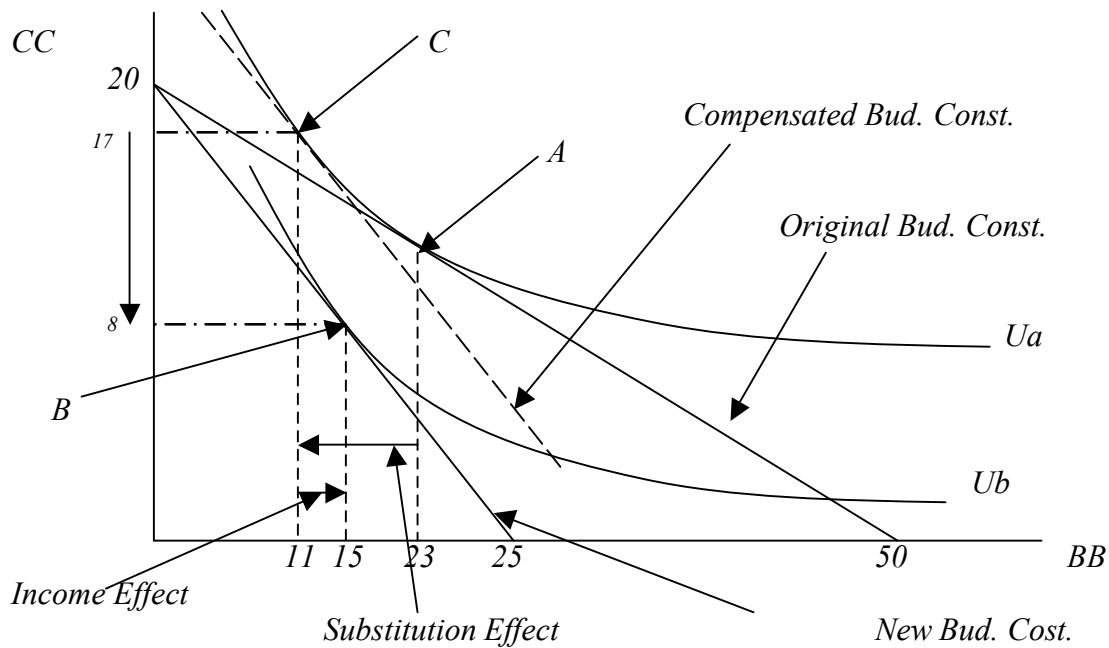


For any quantity a firm produces, in the short run, they will have to produce with a fixed amount of some inputs (e.g. capital). Their short run average cost will be determined by their ATC curve given their level of capital and output. In the long run, they will choose the level of capital that generates the lowest possible ATC for the profit maximizing level of output. Say the price of the good they make rises in the short run (b.c. demand increases) and they want to increase production. They can only do so in the short run by increasing the amount of variable inputs (e.g. labor) they use. This causes ATC to rise as they move along their current, short run, ATC curve (off their expansion path). In the long run, they can adjust the amount of capital they use and switch to a new ATC curve that again allows them to produce at the lowest possible average cost (move back to the expansion path). By connecting the lowest possible ATC at each level of output (with the optimal level of capital, along the expansion path), we can trace out the LRAC curve.

6. George only consumes two goods, baked beans (BB) and clam chowder (CC).
- George's income is \$100
 - The price of baked beans is \$2 per can and the price of clam chowder is \$5 per bowl.
 - Baked beans are an inferior good for George and he consumes 23 cans of baked beans.

One day the price of baked beans rises to \$4/can.

- a. (12) On the graph below, illustrate George's optimal bundles before and after the price change and show both the income and substitution effects. Explain what about your graph reflects the fact that BB is inferior. (Label all relevant parts of the graph!).



George starts at bundle A. After the price of BB changes, he changes his consumption to B. We can decompose this move into a substitution effect (change caused by change in relative prices, but not utility) and an income effect (change caused by change in purchasing power, but not relative prices). To get the substitution effect, we see how his consumption would change if he faced different relative prices but could still afford the same level of utility, U_a , but faced a different price ratio. With a new price ratio of $4/5$ (instead of the original $2/5$), George goes to bundle C to find a place where his MRS is $4/5$. The change in consumption of BB from 25 to 11 is George's substitution effect. For the income effect, we look at how George's behavior changes if his budget constraint changes from the compensated budget line to the new budget line (from bundle C to bundle B). In this case, since BB are inferior, the decrease in purchasing power causes the income effect to be positive. That is, when his budget line changes from the compensated one to the new one, his consumption of BB changes from 11 to 15. Note, he is still consuming less BB than originally, so BB are not a Giffin good, and demand is downward sloping.

- b. (5) True or False: **Clam Chowder** (on the vertical axis!) is a normal good. Explain how you know.

When we look at the implied change in income (less purchasing power) from the Compensated Bud. Const. to the New Bud. Cost., we see George consumes of CC drops from 17 to 8. A decrease in income leading to a decrease in consumption of a good implies the good is normal.

7. (10) Researchers have found that following a 5% increase in the price of gasoline, the quantity demanded a week later falls 2% but a year after the price increase, the quantity demanded falls an additional 6% (for a total drop of 8%).

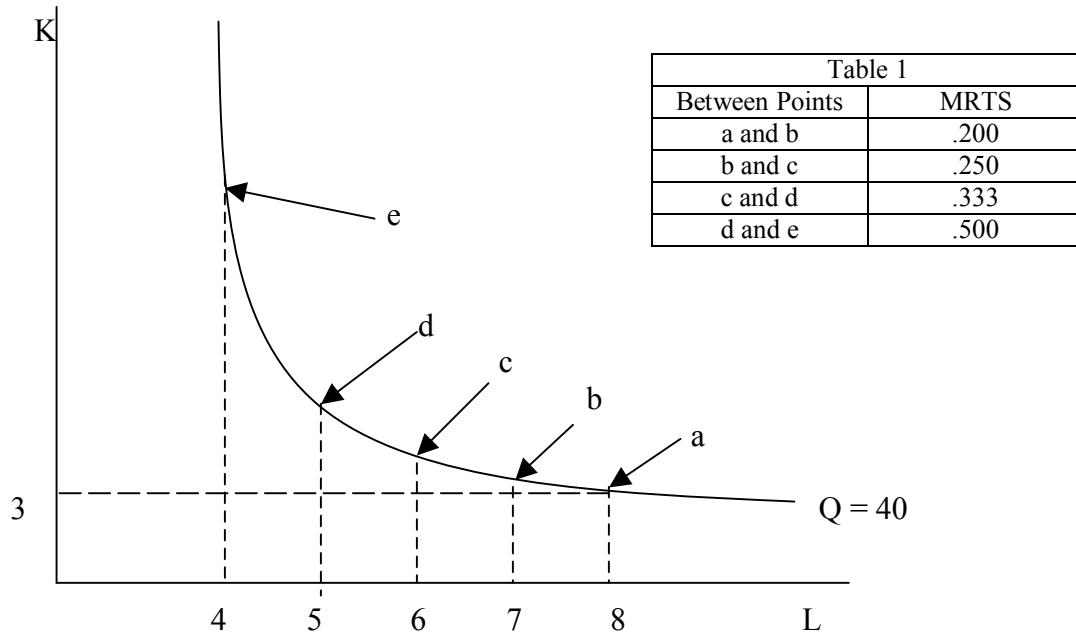
- What is the demand elasticity for gasoline in the short run (a week) and the long run (after a year)?
- Are you surprised by the change in the elasticity over time? If not, explain why.
- Would you expect complaining about how much money people are spending to buy gasoline to diminish over time? Using economic reasoning, explain your reasoning.

In the short run, elasticity is -0.4 while in the long run it is -1.6 .

No, I am not surprised. In the short run, it is difficult to find substitutes for gasoline and so people cannot decrease consumption too much. In the long run, they might buy more fuel efficient cars, carpool, move closer to work, ride a bike, take mass transit, etc. and their consumption falls even further.

If demand is inelastic, a price increase leads to a higher expenditure ($P \cdot Q$) on the good but if demand is elastic, a price increase actually leads to a decrease in total spending on the good. After a year, with elasticity at -1.6 , people would be spending less on gasoline than before the price increase.

8. Suppose you are hired as a new manager of a firm producing 40 units of output with 8 units of labor and 3 units of capital. Assume price of labor is \$50 and the price of capital is \$150. Along the isoquant, the $MRTS_{LK}$ is as noted in Table 1.



Given the above graph and table:

- a. (6) Explain how the firm can determine whether it is minimizing the cost of producing 40 units of output.

They need to see whether $MRTS = PL/PK$. In this case, between a and b, the $MRTS$ is .2 and $PL/PK = .333$. Since they are not the same, they cannot be minimizing cost.

- b. (6) In detail, explain how, as manager, you make the optimizing decisions to minimize cost.

I consider firing a worker (the 8th worker) and replacing the worker with .2 units of K. I save \$50 by firing the worker but need to spend $.2 \times 150$ or \$30 on extra K. I lower total cost by \$20. Then I consider firing the 7th worker and replacing the worker with .250 units of K. This saves \$50 on labor but increases the cost of K by \$37.50. I lower total cost by \$12.50. Then I consider firing the 6th worker and replacing the worker with .333 units of K. This lowers labor cost by \$50 but raises capital costs by \$50. The cost of firing the worker equals the benefit so I do it but stop here. At 5 workers, I minimize total cost. At this point, $MRTS = .333$ and $PL/Pk = .333$.

- c. (5) To minimize cost, you should use 5 laborers and $3 + .2 + .25 + .333 = 3.783$ amount of capital.

9. Assume Johnson's Pink Slip Company (specializing in pink women's undergarments) has the following demand and total cost structure. (Hint: use the extra columns to get the information you need to answer the question).

Demand		Cost Schedule					
P	Q	TR	MR	Q	TC	MC	MC t
				0	150		
80	1	80	80	1	170	20	45
75	2	150	70	2	195	25	50
70	3	210	60	3	230	35	60
65	4	260	50	4	280	50	75
60	5	300	40	5	350	70	95
55	6	330	30	6	440	90	115

- a. (4) What is the profit maximizing level of output this firm should produce?

$$MR = MC \text{ at } Q = 4$$

- b. (4) Should they consider shutting down? Why or why not?

Profit = -20. If they shut down, they pay 150 in fixed cost. They should not shut down.

\$75 of the fixed cost comes from the amount paid to a security company to patrol the factory at night (security does not contribute to output).

- c.(4) Say the security company raise the price of its services by \$100 (but the firm is still under a long term contract). How will the higher security costs affect the profit maximizing level of output in the short run?

Fixed cost is now \$250. Since the change is in Fixed Cost, MC will not change and $MR = MC$ at $Q = 4$. The firm's profit at $Q = 4$ is now $-\$120$, but they lose \$250 if they shut down. Their behavior should not change.

- d. (4) Does your answer to c. change if there is a clause in the contract that states it is possible to end the security contract if the company stops producing? Explain.

Now, the security cost (\$175) is fixed, but not sunk. The comparison therefore changes. By producing $Q = 4$, they lose \$120, but if they shut down, the remaining fixed cost is only \$75 ($\$250 - \175). Now the firm should shut down.

- e. (4) Going back to the original cost numbers (as for a. and b.). Now consider an excise tax of \$25 per unit. Will this affect their profit maximizing level of output? If so, how?

Now, $MR = MC$ at $Q = 3$. Cost is \$305 and TR is \$210. They are losing \$95, but fixed cost is still \$150. They should not shut down.

10. (6) “Something must be done about prices in the pharmaceutical industry. Pharmaceutical companies make twice the profits as firms in other industries and they must be stopped. I propose a 100% tax on profits for firms in the drug industry.”
- Dennis Rodman Clinton, Democratic Congressman from Delaware.

How would Hazlitt respond to the above quote.

Hazlitt would disagree. To economists, profits are a signal that not enough resources are devoted to the industry. The high level of profits encourages more firms to enter the industry and pull more of society's resources into the industry in search of profits (and out of industries where too many resources are now being used). Though firms do not think about it, by searching for profits and entering the industry, firms will make societal resource allocation more efficient.

By taking away profits, firms will have no incentive to enter the industry and resources allocation will continue to be inefficient.