

**Assignment #5**  
**Econ. 1A**  
Jonathan Hill

Homework is due at the beginning of class. If you cannot come to class, you may try to make arrangements with your TA to turn in your assignment early.

You may work together on these assignments. However, each student must turn in his or her own assignment.

1. Suppose Macrosoft has a monopoly in the waxle market (whatever waxles are). The demand for waxles is  $Q = 5000 - (.20)P$  where  $Q$  the quantity of waxles, and  $P$  is the price of waxles. In addition, the marginal cost of producing waxles is  $MC(Q) = 10Q$ , and the average total costs are  $ATC(Q) = 5Q + 2000/Q$ .
  - a. Write an expression for the total revenue *as a function of the quantity of waxles* that Macrosoft sells.
  - b. It just so happens that for this market the marginal revenue for waxles is  $MR(Q) = 25,000 - 10Q$ . [You don't have to worry about where this came from, but for those of you who have had calculus, notice that this is simply the derivative of the total revenue.] Find the profit maximizing level of output for Macrosoft and the price that Macrosoft will charge for waxles. Find the highest level of profit the firm earn.
  - c. Sketch the demand curve and the marginal revenue curve on the same graph and explain intuitively why the marginal revenue curve lies below the demand curve. Indeed, what one (statistically demonstrable) principle is microeconomics implies  $MR < P$ ? Also, sketch in the MC and ATC curve, denote the optimal level of output, the market price, the profit box, and the break-even point. Finally, sketch and derive the consumer surplus CS.
  - d. What must be true about the elasticity of demand at the profit maximizing level of output? Comparatively, at the TR maximizing level of output?
  - e. Without calculating the elasticity of demand, what could you say about the elasticity of demand if Macrosoft produced 2,600 waxles? Give your reasoning.
  - f. Suppose instead Macrosoft is able to perfectly price discriminate. Re-sketch Macrosoft's market equilibrium, and denote the area that represents profit. Also, what is the new level of CS? How does the new quantity level compare the single-price level? Comment on the implications for equity and efficiency.
2. Suppose that Elise is a monopolist. At her current level of production, if Elise increases her level of output by 1 unit, her total costs will increase by \$11. If the current price that Elise charges is \$15, what can you say about whether or not she is maximizing her profits? Give your reasoning.
3. Draw the marginal cost curve, the average total cost curve and the average variable cost curve for a monopolist whose profit maximizing level of output and price are  $Q^*$  and  $P^*$  *and who is earning a loss (ie negative economic profits)*.
4. Suppose that labor costs decrease for a monopolist. In response, what will happen to the profit maximizing level of output and price for the monopolist?
5. Suppose that Mr. Iron has just purchased Reading Railroad and now has a monopoly on the railroad stations in the country of Hasbro. If the marginal revenue from selling another train ticket is given by  $MR(Q) = 48,000 - 60Q$  (where  $Q$  is the number of tickets sold), then what is the *most* you can say about the profit maximizing number tickets that Mr. Iron will sell?



6. Suppose that Lewis has a monopoly on tires in the small town where he lives. Lewis currently sells 100 tires/month. In order for Lewis to sell an additional tire, he would have to lower the price.
  - b. If the marginal revenue is not equal to \$49, then explain why.
7. Reconsider #1 in the single-price case. Now, suppose that the government has decided to impose a per unit sales tax on waxles. Recall that sales taxes reduce consumer's willingness to pay for a product by the amount of the tax. In general terms, how will this tax affect the quantity of waxles sold in the market? Try to sketch the outcome.
8. OPEC has recently announced that it plans to cut oil production in order to bolster oil prices that have fallen as a result of the worldwide economic slowdown. In what follows, assume that OPEC is successful at collusion and that it is able to behave like a monopolist.
  - a. Show how the price of oil changes as a result of the economic slowdown. That is, suppose that prior to the economic slowdown the profit maximizing level of output for OPEC is  $Q^*$  barrels of oil per day. Show how the price of oil would change if there were an economic slowdown *and* if OPEC were to continue producing  $Q^*$  barrels of oil per day.
  - b. Given the economic slowdown, what will happen to OPEC's profit-maximizing level of output? Explain.
  - c. How will the new price of oil compare to the price of oil in part a?