ANSWERS PS#2 - Economics 352 – I.O. Wissink S05

1. Critically evaluate the following statements and explain in what way they are true, false, or uncertain.

   a) Monopolists are never ever allocatively efficient. **ANS:** True, unless their demand curve is completely elastic (unlikely), or they successfully practice 1st degree price discriminate, or they are confronted with a price ceiling or regulated marginal cost pricing. Left alone to profit maximize as a simple monopolist, they will not be allocatively efficient.

   b) Monopolists are never ever productively efficient. **ANS:** False. They may very well be, but there are no internal forces making it necessarily the case.

   c) Since monopolists produce less than what would be produced under competitive conditions, monopolists create shortages. **ANS:** False. At P^{SM} all the units demanded, X^{SM}, are supplied, so there is no shortage.

   d) Monopolists will never earn zero economic profit since entry does not force profits down to zero as in perfect competition. **ANS:** False. They may very well have economic profit = 0, but there are no market forces making it necessarily the case.

   e) Monopoly is a bad thing for consumers and a good thing for producers. Therefore, on balance, we can't be sure that monopoly is responsible for any loss in economic efficiency. **ANS:** False. Under the monopoly solution there is a positive amount of dead-weight-loss, relative to allocative efficiency. There is lost producer surplus and there is lost consumer surplus that isn't transferred to the monopolist. Therefore net social surplus is smaller under X^{SM} than at X^{allocatively efficient}, even though the amount of producer’s surplus is larger under simple monopoly than under what producers’ surplus would be with the efficient competitive outcome.

   f) A tax on the monopolist’s economic profit will force the monopolist to expand output to the allocatively efficient level. **ANS:** False. A tax on economic profit does nothing to the behavior of the monopolist (unless it drives the monopolist out of business entirely). If the entire profit function is reduced by, say 2%, everywhere, then the maximum point will still be at the same value of X and so X^{SM} and P^{SM} are the same.

   g) A per unit tax on monopoly output will force the monopolist to expand output to the allocatively efficient level. **ANS:** False. A per unit tax on monopoly output will result in the monopolist selling even less and at a higher price to demanders. It makes the matter go from bad to worse. (Note, a per unit subsidy could get the monopolist to sell more.

   h) Rent seeking behavior only applies to monopolists in the real estate business. **ANS:** False. Dumb statement. See book on the definition of rent. The concept of rent is much broader than its common application to the real estate business.

2. Suppose that there are 1000 identical firms producing eggs. The total cost curve for each firm is given by tci = xi^2 + 10xi, i = 1,...,1000. (Note that xi is firm i’s output.)

   a) For srs^firm you get: x^S = \frac{1}{2}P - 5; for SRS^mkt you get: X^S = 500P – 5000.

      To get this, find the firm’s mc curve: mc = 2x+10. Then note that in equilibrium under the assumption
of perfect competition, since \( mr=mc \) to profit maximize and \( P=mr \) since the firm is a price taker \( \Rightarrow \) 
\( P=mc. \) So the firm’s supply curve is: 
\[ P=2x+10 \text{ or } x^S=1/2P - 5 \]. Now multiply \( x^S=1/2P – 5 \) by 1000 to get 
\[ X^S = 5000P – 5000. \]

b) If market demand is 
\[ P = 40 - 1/250X \] 
\( \Rightarrow \) 
\[ X^D = 10,000 – 250P. \] Setting \( X^D=X^S \) gets: 
\[ \Rightarrow P^* = 20 \text{ and } X^* = 5,000 \] 
\[ \Rightarrow N = 1000 \Rightarrow \text{profit} = 25 \Rightarrow \text{NSS}^* = (½)(30)(5000) = $75,000. \]

c) Note: inverse market supply now takes on the role of monopoly marginal cost. 
So: \( mc^{\text{TRUMP}} = (1/500)X + 10 \text{ while } mr^{\text{TRUMP}} = 40 - (2/250)X. \) 
Setting \( mr = mc \) \( \Rightarrow \) 
\[ (1/500)X + 10 = 40-(2/250)X \] 
\[ \Rightarrow X^M = 3000, \ P^M = $28, \ X^M = 3, \ \text{profit}^M = $45,000 \] 
\[ \Rightarrow \text{NSS}^M = (½)(12)(3000) + (12)(3000) + (½)(6)(3000) = $63,000 \] 
\[ \Rightarrow \text{dwl} = 75,000 - 63,000 = $12,000. \]

d) If \( P_{\text{ceiling}} = $20, \) then the monopolist would choose \( P = $20 \) and \( X = 5000. \) Note the monopolist’s demand become flat at $20 until it reaches the “old” demand curve at \( X=5000. \) Then it follows the old demand curve the rest of the way down. Consequently, marginal is flat and equal to $20, too, until the kink in this “new” demand curve. At the kink, the mr takes a vertical dive straight down until it hooks up with the “old” marginal revenue graph and then follows it. The intersection of mr and mc is therefore at the quantity (\( X=5000 \)) where this vertical segment of marginal revenue occurs. And the price is up on the demand curve at the kink (\( P=5000 \). Draw it!

3. Prove that a simple monopolist left alone to profit maximize will never choose to operate in the inelastic portion of his demand curve. \( \text{ANS:} \) Suppose you claim that \( P^0, X^0 \) profit maximizes and \( X^0 \) is in the inelastic portion of demand. If you increase \( P \) then you will sell less (due to the law of demand); but you will increase total revenue (since demand is price inelastic at this \( P^0 \)). Since you sell less you produce less so your total costs will decrease (since costs are an increasing function of output); \( \Rightarrow \) profit increases (since \( \text{tr went up and tc went down} \). Therefore \( X^0 \) could not have maximized profit.

4. Testing for short-run positive economic profit is a sure-fire way to conclude whether or not a firm has monopoly power. \( \text{ANS:} \) False. Even perfectly competitive firms can experience positive economic profit in the short-run.

5. If possessing market power is defined to be the ability of the firm to charge a price in excess of marginal cost, then anytime there is only one firm in an industry, it follows that the firm has market power. \( \text{ANS:} \) Usually yes. A monopolist typically faces a downward sloping demand curve and when demand is downward sloping, \( P>mr. \) Therefore, a profit maximizing monopolist, setting \( mr = mc \) will charge a price in excess of marginal cost, i.e., \( P>mc. \) However, these are two notable exceptions: 1) if we are dealing with a perfectly contestable market, then even though there is only one firm in the market, the firm will not possess market power as defined in the statement of the question and 2) if for some strange reason the monopolist is confronted with a completely elastic demand curve for the commodity he has a monopoly over – but then that’s not really a monopoly, right?
6. Would a profit-maximizing dominant firm ever produce more than if it were a monopoly? **ANS:** See figure.

7. If \( x^D = 12 - 2P \), then \( X^D = 1200 - 200P \) (aggregate demand, multiplying by 100) and \( P^D = 6 - (1/200)X \) (the demand curve we graph).
   From this it follows that \( \$mr = 6 - (2/200)X \). We know that \$mc = 2. We also know that to profit maximize you set \( mr = mc \): i.e., \( 6-(2/200)X = 2 \) \( \Rightarrow X^M = 400; x^M = 4; P^M = $4; \text{profit}^M = $800 \). At \( X^M \), consumer surplus is \( \frac{1}{2}(2)(400) = $400 \). At \( X^M \), producer surplus is \( (2)(400) = $800 \). Note that net social surplus is \( 400 + 800 = $1200 \).

8. Show how marginal revenue can be written as a function of the own price elasticity of demand.
   \[ mr = P(1 + 1/\eta) \] where \( \eta \) is the own price elasticity of demand for the monopoly output.

9. Show how the Lerner Index can be written as a function of the own price elasticity of demand.
   \[ LI = (P-mc)/P \] and knowing at a profit max, \( mr=mc \) and using the equation for \( mr = P(1 + 1/\eta) \) you get: \( LI = - (1/ \eta) \) where \( \eta \) is the own price elasticity of demand for the monopoly output.
10. Graphically demonstrate the equilibrium for a simple profit maximizing monopsonist.

11. Derive the short run supply curve for a simple profit maximizing monopolist. **ANS:** HA! There isn’t one.

12. If the demand curve is $X(P) = \frac{5}{P}$, the elasticity is always -1. Total revenue is a constant and always equal to $5$ no matter what you do (provided $P$ is strictly positive). Because revenue always equals $5$, the monopoly maximizes its profit where its total costs are as low as possible. That is, the monopoly should produce as little as possible, one unit, to maximize its profits at $4$. 