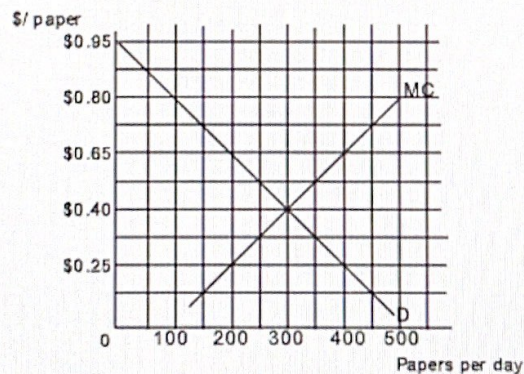


ECON 111: Fall 2021  
Daniel Barbezat and Tyler Porter  
Problem Set 5

Please complete these problems to the best of your ability and submit your solutions on Gradescope by 11:59pm on Wednesday, November 3. When drawing any graphs, please use the appropriate labels on axes and specialization points.

1. Amurst is a small isolated community served by one newspaper. There is no local radio or TV station and no Internet access. The Amurst Gazette is the only local source of news. The figure below illustrates the demand for the Amurst Gazette and the marginal cost of printing the paper. The Amurst Gazette is a profit-maximizing, single-price monopoly.



- (a) How many copies with the *Amurst Gazette* print each day?
- (b) What price will the newspaper charge?
- (c) What is the efficient number of daily copies of the newspaper?
- (d) At what price could the efficient number of copies be sold?
- (e) Explain why the firm does or does not produce the efficient number of copies of the newspaper.
- (f) Compared with the efficient outcome, how much consumer surplus is diverted to the newspaper firm as a result of its monopoly.



2. Suppose that the market demand curve for calculators is given by:

$$P = 50 - 2Q_D$$

The marginal cost of producing each calculator for each firm is given by  $Q$ , where  $Q$  is the number of calculators produced. Here, marginal cost is not constant, as in some of our past examples

- (a) Sketch the market demand curve for calculators.
- (b) Suppose that there is a single monopolist in the market producing calculators. Sketch their marginal cost and marginal revenue curves.
- (c) What quantity and price would the monopolist charge if they wanted to maximize profit? How much deadweight loss does this result in?
- (d) Suppose now that there are two firms in the market that sell differentiated calculators. Let's call these firms A and B. They face the same demand curve as before:

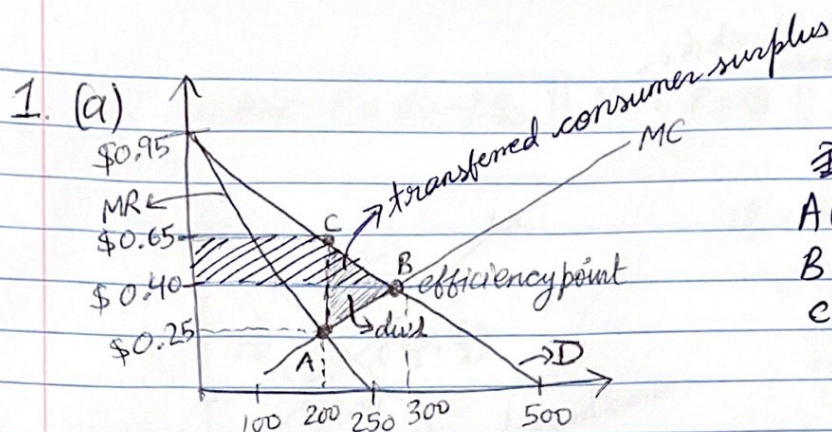
$$P = 50 - 2(Q_A + Q_B)$$

Suppose that  $Q_B = 10$ . Sketch firm A's marginal revenue curve given firm B's production level. What is firm A's profit maximizing quantity in response to firm B's production?

- (e) Suppose now that we take firm B's production  $Q_B$  as a variable. Write down firm A's marginal revenue curve as a function of both  $Q_A$  and  $Q_B$ . Then, find firm A's profit maximizing quantity  $Q_A$  using this marginal revenue curve and firm A's marginal cost curve.
- (f) Sketch firm A's profit-maximizing quantity  $Q_A$  as a function of  $Q_B$ . Also sketch firm B's profit-maximizing quantity by either following the same steps as you did for firm A in parts d and e, or by arguing that it will be symmetric.
- (g) Find the equilibrium quantity of firm A and firm B in this duopoly setting. What price does each firm charge at the equilibrium? Finally, sketch and compute the deadweight loss arising from the inefficiently low quantity at the duopoly outcome.



# Practice Problem Set 5 (for Midterm 2)



~~DE~~  
 A(200, 0.25)  
 B(300, 0.40)  
 C(200, 0.65)

Amurst Gazette will produce 200 copies each day.

- (b) Newspaper will charge 0.65\$.
- (c) efficient number of daily copies is 300.
- (d) efficient price is \$0.40.
- (e) Because of the monopolistic scenario, firm will behave as monopolist. maximising the profits, making the price as a single seller

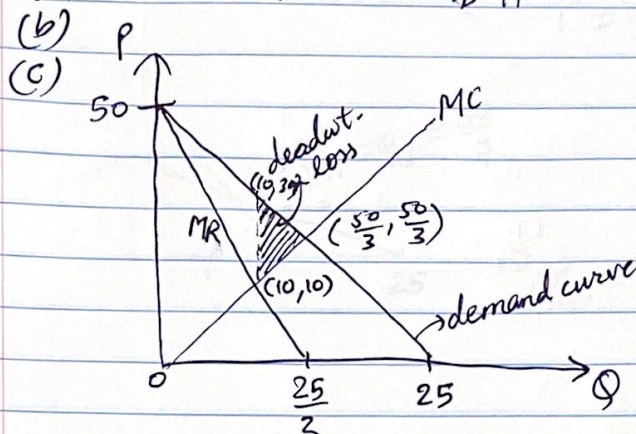
(f)

$$\text{Transferred Consumer Surplus} = \frac{1}{2} \times (200 + 300) (0.25)$$

$$= \boxed{\frac{125}{2}} \text{ Ans}$$



2. (a) demand:  $P = 50 - 2Q_D$  ||  $MC: P = Q$  ||  $MR: P = 50 - 4Q$  individually faced



$$Q = 50 - 4Q$$

$$\Rightarrow 5Q = 50$$

$$\Rightarrow Q = 10$$

$$\Rightarrow P = 10$$

profit maximized

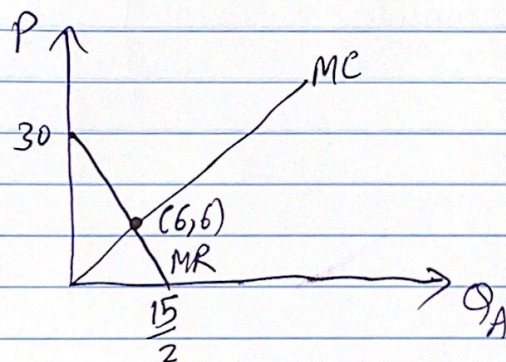
Deadwt. loss =  $\frac{1}{2} (30 - 10) \left( \frac{50}{3} - 10 \right) = \frac{1}{2} \times 20 \times \frac{20}{3} = \boxed{\frac{200}{3}}$  Ans

(d)  $P = 50 - 2(Q_A + Q_B)$

(e)  $P = 30 - 2Q_A$  (when  $Q_B = 10$ )

$MR_A: P = 30 - 4Q_A$   
 $MC_A: P = Q_A$  }  $MR_A = MC_A \rightarrow \text{profit maximized}$

$$30 - 4Q_A = Q_A \Rightarrow \boxed{Q_A = 6}$$



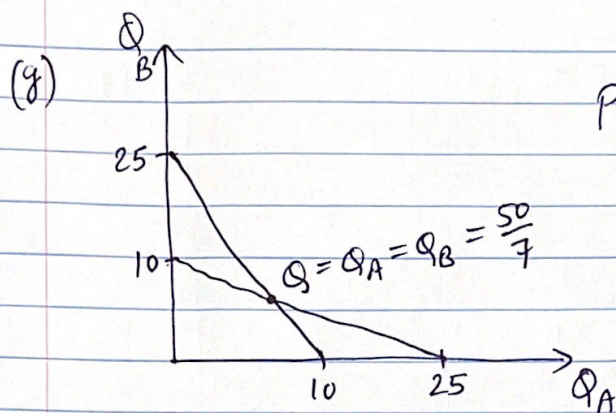
(f)  $MR: P = (50 - 2Q_B) - 4Q_A \Rightarrow P = Q_A : MC_A$

$$\Rightarrow 5Q_A + 2Q_B = 50$$

$$\Rightarrow \frac{Q_A}{10} + \frac{Q_B}{25} = 1$$

|| by for  $Q_B$ :  $\frac{Q_B}{10} + \frac{Q_A}{25} = 1$





$$P = 50 - 2\left(\frac{50}{7} \times 2\right)$$

$$P = \frac{350 - 200}{7} = \boxed{\frac{150}{7}}$$