Econ 200
Spring 2019
Midterm 2
Key

Name:

TA Name/Section:

115 Points, 80 minutes. *You may use any non-graphing calculator, but no notes or scratch paper. Scratch paper is attached. Please write legibly, show your work, and round answers to 2 decimal places, if necessary.*

Anyone suspected of cheating may receive a zero for the exam and for the course.

1. (30 points) Externalities
    a. (5 points) Explain why negative externalities produce overconsumption of goods? How does this overconsumption result in deadweight loss?

        Because the actors in the market do not fully internalize the costs of production (1 point), the price in the market is less than the true social cost (2 points) and so people buy more/firms sell more than they would if they had to pay the full cost (2 points).

    b. (10 points) The weekly supply of cigarettes is given by $P = 10 + \frac{1}{3}Q$ and the demand is given by P=30-Q. Cigarette smoking causes a $2/pack external cost on non-smokers, resulting in a marginal social cost of cigarettes equal to $MSC = 12 + \frac{1}{3}Q$. Find the private market equilibrium for cigarettes if no externalities are considered and the socially efficient quantity and price once the externality is considered.

        Private market (5 points):

        $10 + \frac{1}{3}Q = 30 - Q$ (3 pts)

        $\frac{4}{3}Q = 20$

        $\mathrm{Q} = 15, \mathrm{P} = 15$ (2 points)

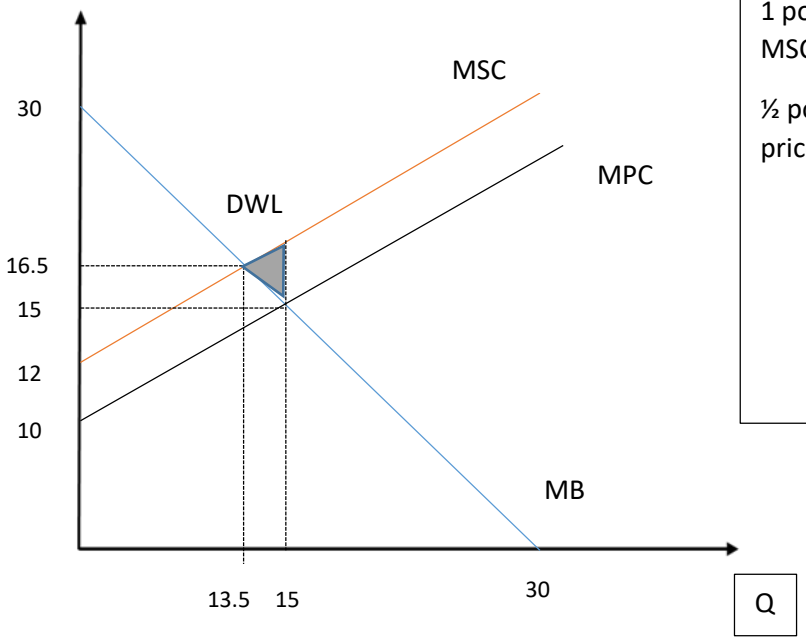
        Efficient market (5 points):

        $12 + \frac{1}{3}\ Q = 30 - Q$ (3 points)

        $\frac{4}{3}Q = 18$

        $\mathrm{Q} = 13.5, \mathrm{P} = 16.5$ (2 points)

c. (5 points) Draw the relevant curves and equilibria from b due to the externality on the graph below. Be sure to identify each curve and the relevant prices and quantities.



1 point each for MPC, MSC, MB

½ point each for the 4 prices and quantities

d. (5 points) Identify the deadweight loss on the graph above and calculate its magnitude.

2 points for drawing in the right place, 3 points for calculation of DWL.

$$\text{DWL} = \frac{1}{2} \times (15 - 13.5) \times 2 = 1.5$$

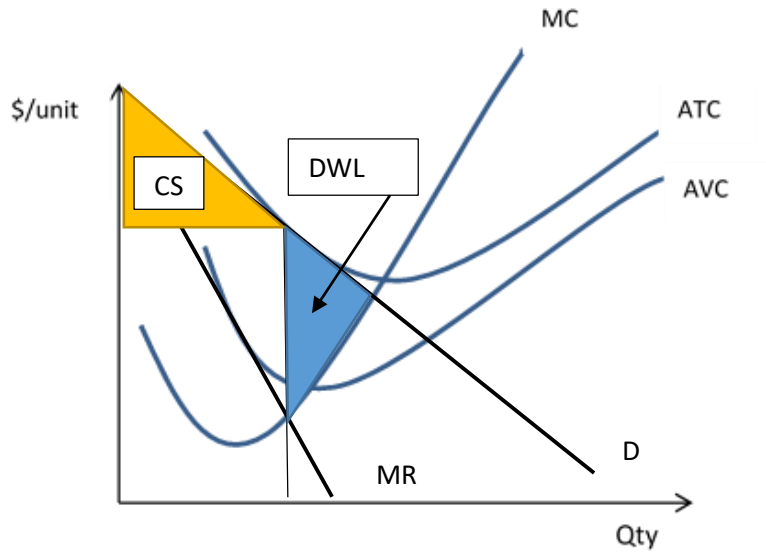
e. (5 points) Suppose that non-smokers wanted to convince smokers to smoke less. What would the Coase theorem suggest they do to achieve this? Name one assumption of the Coase theorem that must be true in order for private bargaining to produce an efficient solution.

Non-smokers can **pay some money** (2 points) to the smokers if they can quit or smoke less. **As long as this amount does not exceed the utility gain for the non-smokers** (1 point) from living in a less smoky/polluted environment.

Two assumptions (2 points for one assumption):

i. Property rights are assigned and can be enforced
ii. Transaction costs are low

2. (26 points) Imperfect Competition
    a. (6 points) Are the profits in the monopolistically competitive market below positive, negative, or zero? Does the market experience deadweight loss? If yes, please identify it on the graph. If no, please state why.



1 point: Profits are zero (or could be negative, I guess. Ugh.)

2 points: Correctly identifying profit max point where MR=MC

2 points: Correctly id'ing qefficient.

1 point: Drawing DWL

    b. (4 points) Draw the consumer surplus on the graph above.

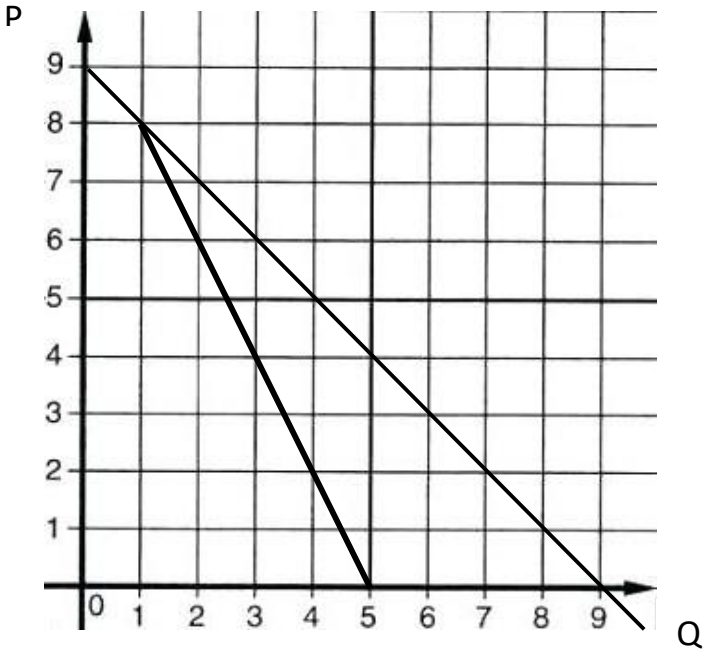
    See graph

    c. (5 points) Explain the role of branding and advertising in helping a firm maintain positive profits in a market with free entry and many firms selling similar products.

    Branding and advertising keep the product differentiated and increase the consumers' perception of space between the firm's product and other similar products. Essentially, they make it so consumers perceive there to be fewer substitutes for the good. (3 points)

    Without them, firm entry into this market will increase the number of substitutes and drive the firm's demand down and make it more elastic until profits are zero (2 points)

d. (6 points) The graph below shows the demand for a good in a monopolistically competitive market. Calculate the marginal revenue for Q=1 through 5, and draw the MR curve. (Remember: Show your work.)



Q	P	TR	MR
1	8	8	8
2	7	14	6
3	6	18	4
4	5	20	2
5	4	20	0

One point for each answer above and one point for graph. They should try to show some work, but a complete table like the one above qualifies, I think. I think some students want to make MR between 0 and 1, and some started with MR=9 for Q=0. Those students then got MR=-1 for Q=5. I think this relates to how the problems were solved in the book, but I am not sure. If they show all their work and it seems like they are following the book, I am ok with giving them full credit.

e. (5 points) As a firm moves from selling Q=3 to Q=4 with the demand in d, how much of the marginal revenue is due to the price effect? How much is due to the quantity effect?

MR = $2

Price effect = 3*(-$1)=-$3 (3 points)

Quantity effect = 1*($5) = $5 (2 points)

3. (30 points) Monopoly
    a. (3 points) When **total revenue** is maximized, what is marginal revenue equal to?

        MR=0

        Give 1 point for MR=MC

    b. (5 points) Suppose a monopolist has to purchase new equipment and his fixed costs increase. Explain what will happen to the monopolist's profit-maximizing output quantity and the monopolist's profits.

        The monopolist's profit - maximizing output quantity will not change (1 point), because the MC is not changing and the rule is still choose Q where MC = MR. (2 points)

        But the profit will decrease, since profit = P*Q-TC and total cost increases due to the increase in fixed cost. Thus the profit will decrease. (2 points)

Now consider Wakanda, Inc., a firm that owns the only known Vibranium mine in the world. The demand for an ounce of Vibranium is given by P=20,000-Q and marginal revenue in this monopoly market is MR=20,000-2Q. The marginal cost of extracting an ounce of Vibranium is $2,000 (note: this is a constant MC).

    c. (5 points) Find the monopoly output and price set by Wakanda, Inc. given these facts.

        MR = MC (2 points)

        20000-2Q = 2000 (1 point)

        quantity is 9000 (1 point)

        price = 20000-9000 = 11000 (1 point)

d. (10 points) Calculate the deadweight loss due to Wakanda's monopoly power. The graph below is provided to aid you in thinking through the problem, but you are not required to use it.

P=MC (new decision rule) (2 points)

20,000-Q=2000 (1 point)

Q=18,000 (1 point)

P=2000 (1 point)

DWL = 0.5*(11000-2000)*(18000-9000) = 40500000 (5 points)

4. (35 points) Costs and Perfect Competition
   a. (4 points) If a firm experiences diminishing marginal product, does this mean that total output decreases? Explain.

No. (2 point) The output still increases under diminishing marginal product, but it increases at a decreasing rate (2 points)

Webby Inc. is a profit maximizing firm in a perfectly competitive market. It develops websites according to the production function in the table. and the corresponding number of workers per day are in the table that follows. Webby pays $4000 per month in fixed costs and pays each worker (programmer) $2000 per month. There are no other production costs.

L (programmer)	Q (websites/mo.)	MPL	TC ($)	VC ($)	MC ($/site)	ATC ($/site)	AVC ($/site)
1	2	2	6000	2000	1000	3000	1000
2	6	4	8000	4000	500	1333.33	666.67
3	14	8	10,000	6000	250	714.29	428.57
4	20	6	12,000	8000	333.33	600	400
5	24	4	14,000	10,000	500	583.33	416.67
6	26	2	16,000	12,000	1000	615.38	461.53

b. (12 points) In the table above, find the MPL, TC, VC, MC, ATC and AVC. No need to show your work.

2 points per column.

c. (5 points) Market price is $500/website. What is their output? Calculate the monthly profits at this level of output. Show your work.

Q=24 (2 points)

Profit = (P-ATC)*Q = (500-583.33)*24 = -1999.92 (3 points)

Can give 2 points if they choose Q=6 and then do all of the work to calculate profit.

d. (8 points) At what price would the firm shut down? What is the decision rule? At what price would the firm exit the market in the long run? What is the decision rule?

Shut down price = 400 (2 points)

Rule: Shut down if P<min AVC (2 points)

Exit price = 583.33 (2 points)

Rule: Exit if P<min ATC (2 points)

e. (6 points) Consider a firm that increases its inputs by 15 percent. For each scenario, state whether the firm experiences economies of scale, diseconomies of scale, or constant returns to scale.

i. Outputs increase 15 percent.

Constant (2 points)

ii. Outputs increase by less than 15 percent.

Decreasing (2 points)

iii. Outputs increase by greater than 15 percent.

Increasing (2 points)