
Midterm 1

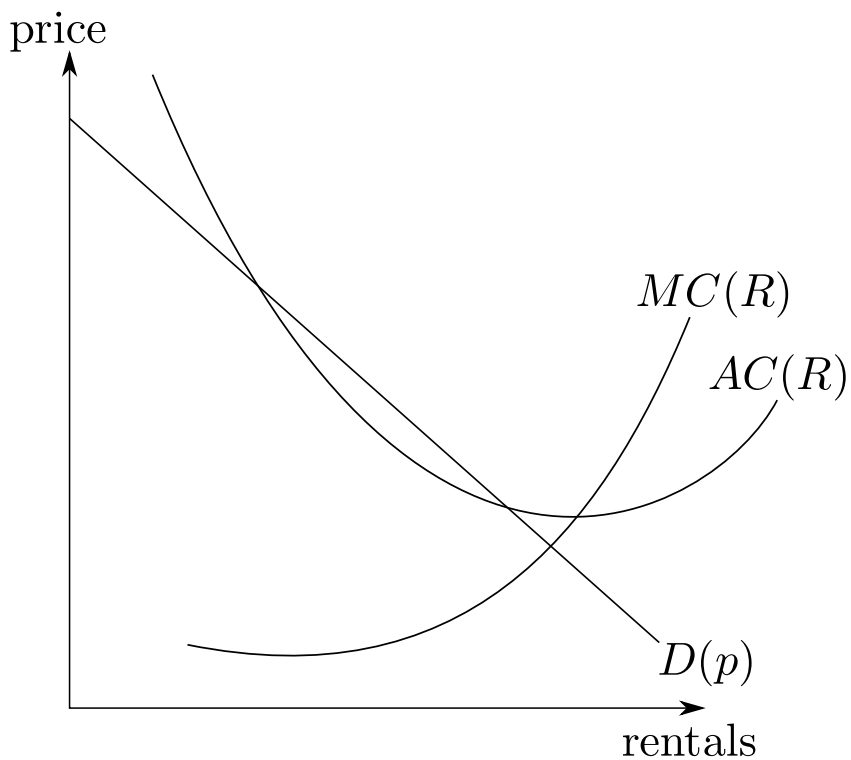
You have until 3:20pm to complete the exam, be certain to use your time wisely. Answer all questions directly on the exam. You must show all of your work to receive full credit. Non-graphing calculators may be used (no graphing calculators or phones can be used). You may leave answers as fractions. Unless a problem says otherwise, you can assume that firms can produce fractions of units and charge non-integer prices (so a firm could produce 82.4 units and sell at a price of \$5.325 per unit). Remember to put your name on the exam. Good luck!

Name:

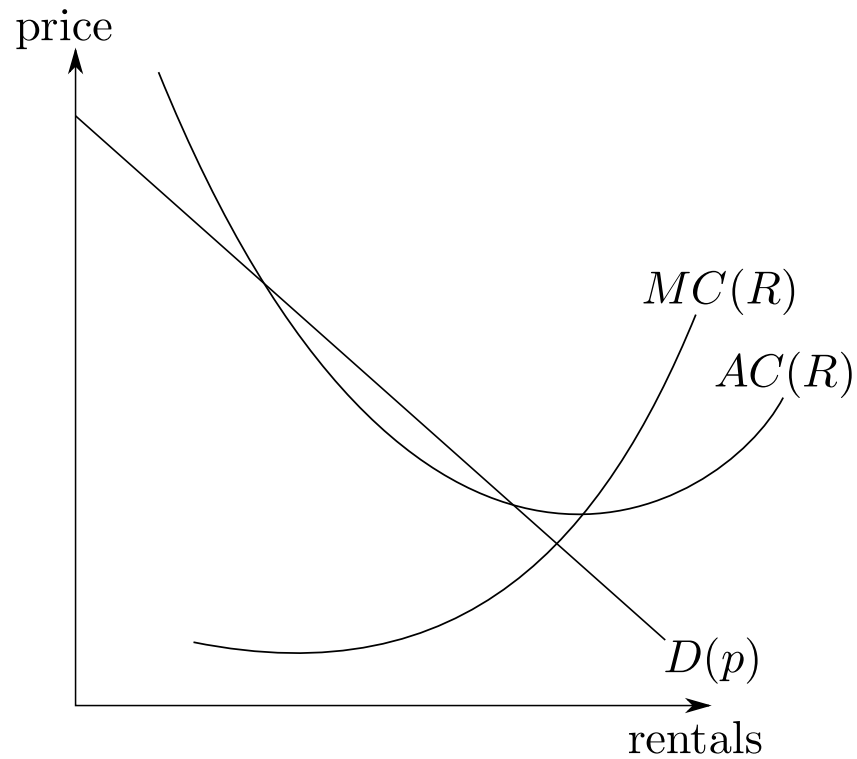
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1. (20 points) The state legislature is considering passing legislation to help Virginia farmers by setting a price floor on crop prices. The price floor simply means that no one is allowed to buy or sell crops at a price below the price floor. It does not guarantee that farmers will be able to sell all of their output (they are still limited by customer demand).
 - (a) Use a graph with quantity of crops on the horizontal axis and price on the vertical axis to demonstrate the effects this price floor will have on the price and quantity of crops sold, producer surplus, consumer surplus, and total surplus. You can assume that the demand curve is a downward sloping line, the supply curve is an upward sloping line, and the price floor is set above the unregulated equilibrium price.
 - (b) Explain whether the price floor makes the market for crops more or less efficient.
 - (c) Explain whether the price floor makes the market for crops more or less equitable.

2. (20 points) The graph below shows the demand curve for DVD rentals (R) in Williamsburg and the average cost and marginal cost curves for a single rental store.



- (a) On the graph above, show the equilibrium price and quantity of DVD rentals if the rental store acts as a monopolist and maximizes profits.
- (b) Explain whether the video store will be a natural monopoly. You should include references to the graph in your explanation. Be certain to clearly label any features of the graph that you use in your explanation.



- (c) On the graph above (it is identical to the original graph) show the largest quantity a regulator could force the rental store to rent such that the store will still choose to stay in business. Assume that the store will go out of business if it is earning negative profits. Also assume that the regulator does not subsidize the store and prices at any given quantity are determined by the demand curve.
- (d) On the graph, show the deadweight loss that results from being at the outcome in part (c) rather than the efficient outcome.

3. (10 points) Suppose that there are several major construction companies that bid for large government contracts. Each time there is a new construction project, the government solicits sealed bids from all of the construction companies. Whichever company submits the lowest bid wins the contract and completes the project for the price they bid. There is a new contract to be bid on every one to two months.
- (a) Describe how collusion might take place in this scenario and how the result of the bidding process would differ if collusion did take place.
 - (b) Would collusion be more or less likely if the number of major construction companies increases? Fully explain your answer.

6. (20 points) Below is an equation giving total costs for a mattress manufacturer as a function of the number of mattresses (M) produced:

$$C(M) = 100M + 10M^2 \quad (1)$$

Given this cost function, the marginal cost function of the manufacturer is:

$$MC(M) = 100 + 20M \quad (2)$$

The inverse demand function for mattresses is given by:

$$p(M) = 700 - 10M \quad (3)$$

- (a) Write down the equation for the average costs of the mattress manufacturer as a function of the number of mattresses produced.
- (b) Given your average cost function in part (a), explain whether this mattress manufacturer experiences economies of scale or diseconomies of scale and whether it would be more efficient to have a single manufacturer or multiple manufacturers in this industry.
- (c) Find the efficient quantity of mattresses.
- (d) Find the quantity of mattresses that will be produced if the manufacturer acts as a profit-maximizing monopolist.
- (e) Calculate the change in consumer surplus and the change in producer surplus when switching from the efficient quantity to the monopolist quantity.

7. (10 points) There are only two firms in an industry, firm A and firm B . The total cost and marginal cost functions of the firms are given by:

$$C_A(y_A) = 50y_A \quad (4)$$

$$C_B(y_B) = 60y_B \quad (5)$$

$$MC_A(y_A) = 50 \quad (6)$$

$$MC_B(y_B) = 60 \quad (7)$$

The two firms compete on price. Whichever firm announces the lowest price captures all of the market demand. If they announce the same price, they each get one half of the total market demand. You can assume that the demand curve is a downward sloping line.

- (a) If firms can only charge integer prices (so they could charge \$9 or \$10 but not \$9.50), what will the equilibrium price be?
- (b) Explain why this equilibrium is inefficient.
- (c) Suppose that a regulator controls entry and exit into the market. There are firms of both types that would be willing to try competing in the market if given permission. The regulator is considering two approaches to improving efficiency in the market. The regulator can use tax revenues to subsidize the current two firms in order to reach the efficient quantity. Alternatively, the regulator can allow an additional firm of each type to enter the market. Which approach should the regulator choose and why?