

1. Voda Reservoir is a profit-maximizing firm and the only producer of bottled water in a country. Currently, Voda Reservoir is earning negative economic profit.
- A. Draw a correctly labeled graph for Voda Reservoir and show each of the following.
- The profit-maximizing quantity, labeled Q_M
 - The profit-maximizing price, labeled P_M
 - The average total cost curve consistent with Voda Reservoir earning negative economic profit, labeled ATC
 - The area of deadweight loss, shaded completely
- B. Suppose the government requires Voda Reservoir to produce the socially optimal quantity of bottled water. On your graph in part A, show the socially optimal quantity of bottled water, labeled Q_S .
- C. Suppose instead the government grants a per-unit subsidy to Voda Reservoir. What will happen to Voda Reservoir's profit-maximizing quantity of bottled water? Explain.
- D. Suppose new producers have entered the bottled-water market and Voda Reservoir continues to operate in the bottled-water market. Will the demand for Voda Reservoir's bottled water become more elastic, become less elastic, or stay the same as new producers enter the market?
- E. Voda Reservoir hires workers in a perfectly competitive labor market.
- If the demand for bottled water increases, what will happen to Voda Reservoir's demand for labor? Explain.
 - The government implements a new regulation that increases the minimum age required for a worker to be employed in a bottled-water factory. What will happen to the market wage in the short run? Explain.

2. The table provided shows the short-run production function for Lowen Feline, a profit-maximizing firm that produces cat food.

Number of Workers	Total Quantity of Cat Food (bags)
0	0
1	5
2	12
3	18
4	23
5	27
6	30
7	32
8	33
9	32

Lowen Feline sells as many bags of cat food as it wants at a market price of \$10 per bag and hires as many workers as it wants at a market wage of \$18.

- (a) Lowen Feline's fixed cost is \$90. Calculate the average fixed cost if Lowen Feline hires 6 workers. Show your work.
- (b) Assume labor is the only variable input to Lowen Feline. Calculate the marginal cost if Lowen Feline increases output from 27 to 30 units. Show your work.
- (c) With the hiring of which worker do diminishing marginal returns begin? Explain using numbers.
- (d) Determine the profit-maximizing number of workers Lowen Feline will hire. Explain using marginal analysis.
- (e) In the long run, a rival company, Gato Food, increases its production from 40 to 50 units, and its total cost increases from \$600 to \$900. Over the output range of 40 to 50 units, is Gato Food experiencing economies of scale, diseconomies of scale, or constant returns to scale? Explain using numbers.

Begin your response to this question at the top of a new page in the separate Free Response booklet and fill in the appropriate circle at the top of each page to indicate the question number.

1. RKB is a profit-maximizing monopoly that produces a new, patented electronic device. RKB is earning positive economic profit.

(a) Draw a correctly labeled graph for RKB, and show each of the following.

- (i) The profit-maximizing quantity, labeled Q_M
- (ii) The profit-maximizing price, labeled P_M
- (iii) The average total cost curve consistent with RKB earning positive economic profit
- (iv) The area representing the deadweight loss, shaded completely

(b) The government wants RKB to produce the allocatively efficient quantity. Would the government impose a binding price ceiling, a binding price floor, a per-unit tax, or a lump-sum tax?

(c) Suppose that the government does not impose the policy you identified in part (b). Consumers now become aware of research that confirms the use of this new device harms users' vision. Given widespread consumer awareness of this research, what will happen to RKB's profit-maximizing quantity in the short run? Explain.

(d) Assume that RKB hires workers in a perfectly competitive labor market.

- (i) Draw a correctly labeled graph for the labor market, showing the equilibrium wage and quantity of labor, labeled W_E and Q_E , respectively.
- (ii) Suppose immigration increases the number of workers in this labor market. On your graph in part (d)(i), show the new equilibrium wage and quantity of labor, labeled W_2 and Q_2 , respectively.
- (iii) RKB uses the optimal combination of capital and labor in its production process. The firm rents capital at \$500 per unit, and the last unit of capital rented has a marginal product of 2,500 units. If the marginal product of the last unit of labor hired is 1,000 units, calculate the wage rate. Show your work.

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2. Keepdry produces and sells rain jackets in a perfectly competitive product market at the price of \$5 per jacket and hires all the workers it needs in a perfectly competitive labor market at the wage rate of \$15. Labor is the only variable input, and the firm's production schedule is provided in the table.

Number of Workers	Quantity of Output
0	0
1	9
2	20
3	27
4	32
5	34
6	35

(a) Calculate the marginal revenue product of the second worker. Show your work.

(b) Diminishing marginal returns will begin with the hiring of which worker?

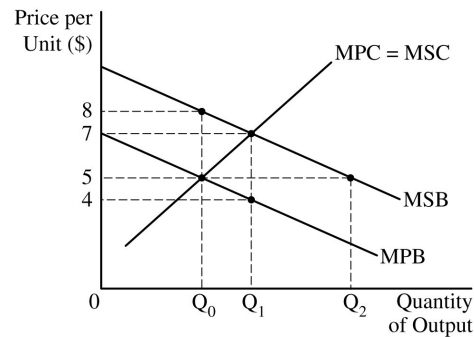
(c) Determine the profit-maximizing number of workers the firm should hire. Explain using marginal analysis.

(d) Assuming Keepdry's fixed cost is \$40, calculate Keepdry's economic profit when hiring the profit-maximizing number of workers. Show your work.

(e) Suppose Keepdry's fixed cost increases to \$80. Will the profit-maximizing number of workers hired in the short run increase, decrease, or stay the same? Explain.

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2. Bueno is a firm that produces and sells guava, a type of fruit. The market for guava is perfectly competitive. The marginal private benefit (MPB), marginal private cost (MPC), marginal social benefit (MSB), and marginal social cost (MSC) curves are illustrated in the graph provided.



- (a) Identify the kind of market failure represented by this graph.
- (b) Using numbers from the graph, identify the marginal external benefit.
- (c) Assume the guava market is in short-run equilibrium and Bueno hires workers in a perfectly competitive labor market at a wage of \$20 per hour. The marginal product of the last worker hired was 6 units of guava per hour.
- Calculate the change in Bueno's profit per hour from the last worker hired. Show your work.
 - Suppose that the government decides to provide a per-unit subsidy to consumers who buy guava. How would the per-unit subsidy affect Bueno's marginal revenue product curve? Explain.
- (d) Instead of hiring workers in a perfectly competitive labor market, assume Bueno hires workers in a monopsony labor market. Will the number of workers hired increase, decrease, or stay the same? Explain.

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Number of Workers	Number of Parked Cars
0	0
1	8
2	20
3	34
4	45
5	54
6	60
7	63

2. Assume that Schmitt Inc. provides car parking services in a perfectly competitive output market and hires labor in a perfectly competitive input market. The market price per car parked is \$10, the daily market wage per worker is \$100, and fixed costs are \$50 per day. The table above shows the number of workers required to park different quantities of cars per day.
- Calculate the marginal revenue product of the second worker. Show your work.
 - How many workers will Schmitt Inc. hire to maximize profit? Relative to this number of hired workers, explain why Schmitt Inc. will not hire one additional worker. Your answer must use marginal analysis and numbers from the table.
 - Calculate the daily profit for Schmitt Inc. at the profit-maximizing quantity identified in part (b). Show your work.
 - Suppose new legislation requires each worker in the parking industry to purchase an individual insurance policy at the worker's expense in order to legally park cars.
 - Will the market wage paid by a typical firm in this industry increase, decrease, or stay the same in the long run?
 - For a typical firm in the industry, will the number of workers hired in the short run increase, decrease, or stay the same? Explain.

Begin your response to this question at the top of a new page in the separate Free Response booklet and fill in the appropriate circle at the top of each page to indicate the question number.

MICROECONOMICS**Section II****Total Time—1 hour****Reading Period—10 minutes****Writing Period—50 minutes**

Directions: You are advised to spend the first 10 minutes reading all of the questions and planning your answers. You will then have 50 minutes to answer all three of the following questions. You may begin writing your responses before the reading period is over. It is suggested that you spend approximately half your time on the first question and divide the remaining time equally between the next two questions. Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. Use a pen with black or dark blue ink.

1. Gigantic Pharmaceutical Corporation has a patent on a prescription drug, making it the only manufacturer of that prescription drug. Gigantic is currently earning a positive economic profit.
 - (a) Draw a correctly labeled graph for Gigantic and show each of the following.
 - (i) The profit-maximizing quantity, labeled Q_G
 - (ii) The profit-maximizing price, labeled P_G
 - (iii) The average total cost curve, labeled ATC
 - (iv) The area representing the consumer surplus, shaded completely
 - (b) Suppose the demand for the prescription drug increases, and Gigantic hires its warehouse workers in a perfectly competitive labor market.
 - (i) What will happen to Gigantic's demand for warehouse workers? Explain.
 - (ii) What will happen to the wage rate Gigantic pays its warehouse workers and the number of warehouse workers it hires?
 - (c) After Gigantic's patent expires, another firm enters the prescription drug market and produces an identical drug that sells for a lower price.
 - (i) What will happen to Gigantic's producer surplus?
 - (ii) What will happen to the consumer surplus in this prescription drug market? Explain.

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1. In the early twentieth century, limited transportation options and the lack of effective substitutes gave Single Cinema monopoly power in a small town. Assume that Single Cinema is a profit-maximizing firm and currently operates at a negative economic profit in the short run.
 - (a) Draw a correctly labeled graph for Single Cinema, and show each of the following.
 - (i) The profit-maximizing price and quantity of tickets, labeled as P_m and Q_m , respectively
 - (ii) The area representing the negative economic profit, shaded completely
 - (b) Explain why Single Cinema continues to operate in the short run despite earning negative economic profit in the short run.
 - (c) Would Single Cinema's total revenue increase, decrease, or stay the same if it decides to sell one fewer ticket than Q_m ? Explain.
 - (d) Single Cinema hires workers in a perfectly competitive labor market with a downward-sloping demand curve. Suppose the number of workers available in the market decreases.
 - (i) What will happen to the wage rate? Explain.
 - (ii) What will happen to the marginal revenue product of the last worker hired? Explain.

2. The table below shows the output a firm produces using different amounts of capital (K) and labor (L). The markets for capital and labor are perfectly competitive. The rental rate of capital is \$75 per unit, and the wage rate is \$200 per unit. In the short run, capital is fixed and labor is variable.

Labor	Output with K=1	Output with K=2
0	0	0
1	10	20
2	25	50
3	38	75

- (a) If the firm uses one unit of capital and one unit of labor, will it be operating with constant, increasing, or decreasing returns to scale? Explain using numbers from the table.
- (b) Assume now that the firm currently has two units of capital and is using three units of labor.
- Calculate the marginal product for the third unit of labor. Show your work.
 - Did the firm experience diminishing marginal returns with the addition of the third unit of labor? Explain using numbers from the table.
 - Calculate the firm's average total cost for its current level of production. Show your work.
 - If the firm's output is sold in a competitive market, what is the lowest output price at which the third unit of labor would be hired?

- (c) Now assume that the monopolist produces 10 units. Using the numbers given in the graph, calculate each of the following. Show your work.
- The monopolist's economic profit
 - The consumer surplus
 - The deadweight loss
- (d) At what quantity is demand unit elastic?
- (e) Suppose the monopolist perfectly price discriminates and chooses the quantity that maximizes profit. Determine the dollar value of each of the following.
- The monopolist's profit
 - The consumer surplus

2. Ray's Stable hires workers in a perfectly competitive factor market for unskilled labor.

- (a) Using correctly labeled side-by-side graphs for the labor market and Ray's Stable, show each of the following.
- The equilibrium wage and quantity for unskilled labor, labeled W_E and Q_E , respectively
 - The wage paid by Ray's Stable and the quantity of unskilled labor hired, labeled W_R and Q_R , respectively
- (b) Is the marginal factor cost of unskilled labor for Ray's Stable greater than, less than, or equal to W_E ? Explain.
- (c) Now assume that the government imposes an effective minimum wage for unskilled labor.
- Show the minimum wage on your graphs in part (a), labeled W_{MIN} .
 - On the labor market graph in part (a), show the quantity of unskilled labor supplied in the labor market as a result of the minimum wage, labeled Q_S .
 - As a result of the new minimum wage, will the marginal revenue product of the last worker hired by Ray's Stable increase, decrease, or stay the same?