

McPeak
PPA 723
Quiz 2

Name: _____
November 9, 2004

1) Returns to scale and economies of scale. (2 points)

a. My current level of production is 7 units. If I double my input bundle and my output level becomes 14 units, do I have increasing, constant, or decreasing returns to scale in production? Why?

b. Is a natural monopoly characterized by economies of scale or diseconomies of scale over the feasible range of output? Explain your answer.

c. Define diminishing marginal returns and decreasing returns to scale.

3) Production and cost functions. (2 points)

- a. You are given the following information. Calculate marginal product for each change in input level.

Input level	Output level	Marginal Product
0	0	NA
1	110	
2	210	
3	300	
4	380	
5	450	
6	510	
7	560	
8	600	
9	630	

- b. Given your findings on marginal product in (a), is the average product curve: downward sloping over all input levels, upward sloping over all input levels, upward sloping for some input levels and downward sloping for other input levels?

- c. If the cost of the input is \$100 per unit, calculate the cost of producing each level of output, and the marginal cost for changing the output level.

Input level	Output level	Cost of producing	Marginal Cost
0	0	0	NA
1	10		
2	22		
3	31		
4	40		
5	48		
6	55		
7	61		
8	66		
9	70		

5) You know that the inverse demand curve is defined by the following function: $P=45-Q$ and costs are defined by $5*Q$ (so you know MC is 5 for all possible levels of Q). (2 points)

a. Use the bisection rule to define the marginal revenue curve

b. Draw the marginal revenue curve, the demand curve, and the marginal cost curve on a single graph.

c. What level of Q should the monopolist produce at?

d. What is the implied price?

e. What is the implied profit?

6) Continue with the information in the previous question, so you are still working with the information that $P=45-Q$, and $MC =5$. (2 points)

a. If this were to become a perfectly competitive market for some reason, what would the market price and quantity in the market be if all firms had identical cost structures to the monopoly firm and the demand curve was unchanged?

b. Show the competitive case in comparison to the monopoly case on a single graph.

c. Calculate the value of the following areas under the competitive and the monopoly structure.

	Competitive Market Structure	Monopoly Market Structure
Consumer Surplus		
Producer Surplus		
Dead Weight Loss		
Total Social Welfare		

7) Necessary and sufficient conditions. Circle the correct answer. (2 points)

Condition One	Condition Two	To identify condition two as true, is condition one necessary or sufficient?
A firm uses an input in production.	Production is technologically efficient with respect to this input.	<i>Necessary</i> <i>Sufficient</i>
An input bundle is economically efficient.	The input bundle is technologically efficient.	<i>Necessary</i> <i>Sufficient</i>
The market is a perfectly competitive market	Price taking behavior by producers	<i>Necessary</i> <i>Sufficient</i>
The bundle K, L satisfies $w \cdot L + r \cdot K = C$	The point defined by the bundle K, L is on the expansion path..	<i>Necessary</i> <i>Sufficient</i>
Average Cost upward sloping at a given level of output	Marginal cost > average cost at that level of output.	<i>Necessary</i> <i>Sufficient</i>
$MR(q^*) = MC(q^*)$	The profit maximizing level of production is q^*	<i>Necessary</i> <i>Sufficient</i>
Felix is a cat	Felix hates baths	<i>Necessary</i> <i>Sufficient</i>
Output less than doubles when inputs double	The firm is experiencing increasing returns to scale	<i>Necessary</i> <i>Sufficient</i>

8) Assume the rental rate of capital is 4 and the wage rate is 8. (2 points)
a. Draw an isocost curve for a total cost level of 80.

b. If the marginal product of labor is 2, what is the marginal product of capital at an economically efficient point? Why?

c. What is the technical name for the slope of an isoquant?

9) Complete the following table. (2 points)

a) Quantity of Output	Fixed Cost	Total Cost	Average Cost	Marginal Cost	Variable Cost	Average Variable Cost
0	5	5	-----	-----	-----	-----
1				15		
2		34				
3		49				
4						15
5		82				
6					95	
7			17			
8		139				

b. If the market price for the output produced is 17 and the market structure is competitive, what level of output is the profit maximizing level of output? Why?

c. Is the information presented in (a) long run or short run cost information? Why?

10) Isoquants. (2 points)

a. Define an isoquant.

b. Is the slope of an isoquant positive or negative. Why?

c. Draw an isoquant illustrating a production setting in which the inputs are easily substituted.