McPeak Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

PPA 723 Spring 2009

Exam 2

All numbered questions are worth 2 points each, sub questions worth an equal share of these 2 points.

1) Complete the following table.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Output | Total Cost | Fixed Cost | Variable Cost | Average Cost | Average Variable Cost | Marginal Cost |
| 0 |  | 20 |  | NA | NA | NA |
| 1 |  |  |  |  | 15 |  |
| 2 | 49 |  |  |  |  |  |
| 3 |  |  | 44 |  |  |  |
| 4 |  |  |  |  |  | 17 |
| 5 |  |  |  | 20 |  |  |
| 6 |  |  |  |  |  | 24 |
| 7 |  |  |  | 22 |  |  |
| 8 |  |  |  | 24 |  |  |

a) Is this a short run or long run information on cost? Why?

1. If the price of the good produced is currently 19, what level of output meets the profit maximizing condition?
2. Draw a figure illustrating the average variable cost and the marginal cost curves based on the information in this table. Identify how you can illustrate the individual firm’s short run supply curve comes on the figure you draw.
3. Production and cost functions. (2 points)
   1. Q=f(L, ) is the production function. Define the marginal product of labor for this production function using an equation or words that describe what the equation represents.
   2. Explain why this production function will exhibit diminishing marginal product as L increases.
   3. If the cost of the input of labor L is $100 per unit and this is the only cost of production, calculate the cost of producing each level of output, the change in Q, the change in total cost, and the resulting marginal cost associated with increasing the input levels listed in the first column.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Input level L | Output level Q | Total Cost of producing Q | Change in Q | Change in total cost | Marginal Cost |
| 0 | 0 | 0 | NA | NA | NA |
| 1 | 110 |  |  |  |  |
| 2 | 210 |  |  |  |  |
| 3 | 300 |  |  |  |  |
| 4 | 380 |  |  |  |  |
| 5 | 450 |  |  |  |  |
| 6 | 510 |  |  |  |  |
| 7 | 560 |  |  |  |  |
| 8 | 600 |  |  |  |  |
| 9 | 630 |  |  |  |  |

1. Circle the correct answer.

|  |  |
| --- | --- |
| **Statement** | **The statement is**  **(circle the correct answer)** |
| The slope of the production function is called the marginal rate of transformation. | True False |
| Producer surplus is calculated as the area under the demand curve and above the price line. | True False |
| In a perfectly competitive market the firm is a price taker. | True False |
| If where price = MC(q), price is less than average variable cost, the firm should shut down and produce q=0. | True False |
| Marginal cost is the slope of the total cost curve. | True False |
| The bisection rule allows us to derive the marginal cost curve from a linear demand curve. | True False |
| A monopsonist has market power because it is the single buyer of a good. | True False |
| The expansion path traces out the cost minimizing input bundles that produce different levels of output. | True False |

4) You are given the following information on the relationship between inputs and production level at various points.

|  |  |  |  |
| --- | --- | --- | --- |
| Points | Labor | Capital | Output |
| A | 1 | 2 | 40 |
| B | 2 | 4 | 80 |
| C | 4 | 8 | 160 |
| D | 8 | 16 | 300 |
| E | 16 | 32 | 450 |

a. Illustrate these points using isoquants.

b. Contrast the returns to scale implied by movement between the points. (circle the correct answer)

From a to b I have (increasing, constant, decreasing) returns to scale.

From b to c I have (increasing, constant, decreasing) returns to scale.

From c to d I have (increasing, constant, decreasing) returns to scale.

From d to e I have (increasing, constant, decreasing) returns to scale.

5) You know that the demand curve is defined by the following function: P=36-3Q.

* 1. Use the bisection rule to define the marginal revenue curve
  2. If total cost is defined by 6\*Q, then you know MC is 6 for all possible levels of Q. What level should the monopolist produce at, what is the selling price if the optimal Q is greater than zero?
  3. What is the monopolist firm’s profit?

1. Assume the market for this commodity was to become a perfectly competitive market for some reason.
   1. What would the market price and amount of quantity in the market be if all firms in the competitive market had identical cost structures to the monopoly firm (MC=6) and the demand curve was unchanged?
   2. Show the competitive case in comparison to the monopoly case on a single graph.
   3. What size is the deadweight loss of monopoly?
   4. What three conditions have to hold in the perfectly competitive market for the supply curve to be horizontal as it is in this case?

7) Technological Progress

a) Illustrate the impact of technological progress on a production function where Q=f(L).

b) Now use a different production function: Q=f(K,L). Illustrate in reference to an isoquant labeled Q1 the area containing input bundles that are: technologically inefficient for producing Q1 and the input bundles that are not feasible for producing the level of output corresponding to the isoquant.

8) Assume the rental rate of capital is 6 and the wage rate is 12.

* 1. Draw an isocost curve for a total cost level of 60.
  2. If the marginal product of capital is 3, what is the marginal product of labor at an economically efficient point? Why?
  3. Identify what values define the slope of an isocost and explain why these values define the slope.

9) Circle the correct answer for each.

* + 1. In a perfectly competitive market the area corresponding to producer surplus is the area:
       1. Below the demand curve and above the price line to the left of the optimal quantity.
       2. Between the supply and demand curves to the right of the monopolist’s optimal quantity and to the left of the perfectly competitive market’s optimal quantity.
       3. Above the supply curve and below the price line to the left of the optimal quantity.
       4. Below the supply curve and above the x –axis to the left of the optimal quantity.
    2. A natural monopoly:
       1. Is the single producer of goods and services that use natural resources as a factor in production.
       2. Faces an upward sloping marginal revenue curve.
       3. Exists due to legal protection given to foster innovation.
       4. Has marginal cost below average cost over the entire feasible range of production for a given market.
    3. P = MC ≥ AC at the profit maximizing point in the long run for a perfectly competitive market because:
       1. Suppliers have price setting power that they use to determine the price –quantity pair that maximizes their profits.
       2. Firms always produce at a level where average fixed costs first begin increasing.
       3. The firm is earning economic profit that is greater than or equal to zero at that point.
       4. The firm chooses this point to maximize total social welfare because they really truly do care.
    4. Consumer surplus:
       1. Sums up the difference between the declining willingness to pay per unit of the good reflected in the downward sloping demand curve and the constant price per unit consumers pay in a market.
       2. Reflects the difference between the average cost of production and the price that is charged in the market when a specific tax is placed on consumers.
       3. Is the marginal cost curve at and above the point where AC(q)=MC(q), q=0 elsewhere.
       4. Is the increase in output that occurs over time after accounting for growth that can be explained by increased use of capital, labor, energy, and material.

10) Circle the correct answer

|  |  |  |
| --- | --- | --- |
| Condition A | Condition B | What type of condition is B for establishing A? |
| MC is above AC at q | AC is upward sloping at q | N, NS S, NN N,S |
| The good is homogeneous | The market is perfectly competitive | N, NS S, NN N,S |
| The market is perfectly competitive | The good is homogeneous | N, NS S, NN N,S |
| You can get to NYC from Syracuse in less than six hours. | There is a bus to NYC from Syracuse that makes the trip in less than six hours. | N, NS S, NN N,S |
| A quantity is the profit maximizing quantity | The quantity is produced in a technologically efficient way. | N, NS S, NN N,S |
| The last dollar rule is satisfied at a bundle | MRS=MRT at a bundle | N, NS S, NN N,S |
| Output more than doubles when inputs double | The firm is experiencing increasing returns to scale | N, NS S, NN N,S |
| The point defined by the input bundle (K,L) satisfies w\*L+r\*K=C | The point defined by the input bundle (K,L) lies on the expansion path | N, NS S, NN N,S |

N,NS : Necessary, not sufficient

S, NN: Sufficient, not necessary

N, S: Necessary and sufficient.