**Economics 150.001**

**American University**

**Spring 2020**

**Problem Set 4**

**\*\* DUE: VIA BLACKBOARD BY 11:59 P.M. MONDAY MARCH 23, 2020 \*\***

**Instructions:**

1. All of your answers will be typed directly into this file. **FOLLOW THE INSTRUCTIONS IN EACH QUESTION REGARDING HOW TO RECORD YOUR ANSWER.**
2. For all typed answers, **USE EITHER THE “ARIAL” OR “HELVETICA” FONT (OR A SIMILAR FONT IF YOU DON’T HAVE THOSE)**
3. For questions asking you to “explain your answer”, you must provide an explanation of your answer to be eligible for full credit.
4. To prepare your file for submission, follow the directions in the description of the assignment on Blackboard
5. Please name the file that you will submit to Blackboard as follows:   
     
   [Family Name]\_[First Name]\_PS4.pdf  
     
   So, for example, a submission from Joe Smith would be named: Smith\_Joe\_PS4.pdf

**PROBLEM 1 (30 POINTS)**

Maggie’s Farm is a vegetable farm that uses land and labor to produce vegetables. At the beginning of every month, Maggie decides how many acres of land she wants to rent and once she decides she cannot increase or decrease the amount of land being used until the first day of the following month. Maggie can, however, increase or decrease the number of workers she uses at any time.

1. If we are analyzing Maggie’s costs over the course of one month (for example, October), which of her inputs (if any) are fixed inputs? Which of her inputs (if any) are variable inputs? **[TYPE YOUR ANSWER BELOW]**
2. Table 1 (on p. 5) depicts monthly production at varying levels of labor on 10 acres of land. Fill in the “Marginal Product of Labor” column of Table 1. **[TYPE YOUR ANSWER INTO TABLE 1]**
3. Maggie is currently renting 10 acres of land per month, at a cost of $30 per acre. Fill in the “Fixed Cost” column in Table 2 (on p. 5). **[TYPE YOUR ANSWER INTO TABLE 2]**
4. The cost of hiring workers for 1 month of labor is $150 per worker. Fill in the “Variable Cost” and “Total Cost” columns in Table 2. **[TYPE YOUR ANSWER INTO TABLE 2]**
5. What is the definition of “Marginal Cost”? (You may answer either in words or with a formula.) **[TYPE YOUR ANSWER BELOW]** Fill in the “Marginal Cost” column in Table 2. **[TYPE YOUR ANSWER INTO TABLE 2]**
6. Is the cost analysis contained in Table 2 a short-run or long-run analysis? How do you know? **[TYPE YOUR ANSWER BELOW]**

**PROBLEM 2 (30 POINTS)**

Henry’s Handbags produces fine leather handbags in a small production facility outside of Washington which Henry rents for $200 per week. He decides each Monday whether or not he wants to rent the production facility for the upcoming week.   
  
His variable inputs include labor and the materials necessary to construct the handbags, and he only purchases these once he has decided how many handbags he wants to produce during the week. (So, for example, if he decides not to produce any handbags in a given week, he will hire no workers and purchase no materials.)

1. Suppose that next Monday Henry decides to rent the production facility, but then decides not to produce any handbags at all. How much would he pay that week in variable costs? How much would he pay that week in fixed costs? **[TYPE YOUR ANSWER BELOW]**
2. Fill in the “Variable Cost” and “Fixed Cost” columns in Table 3 on p. 5. (Your answer to part (a) combined with the Total Cost numbers (which are provided in the table) give you enough information to fill in the Variable and Fixed Cost columns.) **[TYPE YOUR ANSWER INTO TABLE 3]**
3. Write out the formulas for Marginal Cost (MC), Average Total Cost (ATC), and Average Variable Cost (AVC): **[TYPE YOUR ANSWERS BELOW]**
4. MC =
5. ATC =
6. AVC =
7. Fill in the “Marginal Cost”, “Average Total Cost” and “Average Variable Cost” columns in Table 3. **[TYPE YOUR ANSWER INTO TABLE 3]**

**PROBLEM 3 (40 POINTS)**

The handbag market is a perfectly competitive market. Henry’s Handbags is one of many handbag producers making identical products, and there are many consumers who demand handbags. The table below contains the supply and demand schedules for the handbag market:

|  |  |  |
| --- | --- | --- |
| Price | Quantity  Demanded | Quantity  Supplied |
| $100 | 4,500 | 500 |
| 120 | 4,000 | 1,000 |
| 140 | 3,500 | 1,500 |
| 160 | 3,000 | 2,000 |
| 180 | 2,500 | 2,500 |
| 200 | 2,000 | 3,000 |
| 220 | 1,500 | 3,500 |
| 240 | 1,000 | 4,000 |
| 260 | 500 | 4,500 |

1. Based on the supply and demand schedules above, what is the equilibrium price in this market? **[TYPE YOUR ANSWER BELOW]**

1. Figure 1 (on p. 6) depicts 3 curves, labeled “A”, “B” and “C”. Which of these curves is Henry’s Marginal Revenue curve? Explain your answer. **[TYPE YOUR ANSWER AND EXPLANATION BELOW]**
2. What is the optimal number of handbags for Henry to produce? Explain how you know it is the optimal quantity. **[TYPE YOUR ANSWER AND EXPLANATION BELOW]**
3. How much profit (if any) will Henry earn if he produces the optimal number of handbags? In your answer, indicate what formula you are using to calculate Henry’s profit. **[TYPE YOUR ANSWER BELOW]**
4. Can the current equilibrium price in the handbag market be the long-run equilibrium price? Explain your answer. (Note: no credit will be given for an answer without an explanation.) **[TYPE YOUR ANSWER BELOW]**
5. Explain how the market will adjust to its long-term equilibrium and how this will affect Henry’s production decision by answering the following:
6. Explain how (if at all) supply, demand and equilibrium price will adjust in the Handbag Market as a whole. **[TYPE YOUR ANSWER BELOW]**
7. Explain how Henry’s Marginal Revenue curve will change. **[TYPE YOUR ANSWER BELOW]**
8. What is the new optimal production level for Henry (i.e. the optimal production level when the market is in long-run equilibrium)? How much profit does he earn at that production level? **[TYPE YOUR ANSWER BELOW]**
9. Your answers to parts (c) and (f) give you enough information to plot two points on Henry’s supply curve. Fill in the blanks below to indicate the co-ordinates of those two points. **[TYPE YOUR ANSWER BELOW]**

**POINT 1:** Price = \_\_\_\_\_\_\_\_\_ Quantity Supplied = \_\_\_\_\_\_\_\_\_\_\_

**POINT 2:** Price = \_\_\_\_\_\_\_\_\_ Quantity Supplied = \_\_\_\_\_\_\_\_\_\_\_

**TABLES AND FIGURES**

**Table 1**

|  |  |  |
| --- | --- | --- |
| *L*  (# of Workers) | *Q*  (bushels of vegetables) | Marginal Product  of Labor |
| 0 | 0 |  |
| 1 | 10 |  |
| 2 | 19 |  |
| 3 | 27 |  |
| 4 | 34 |  |
| 5 | 40 |  |
| 6 | 45 |  |
| 7 | 49 |  |
| 8 | 52 |  |

**Table 2**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *L*  (# of Workers) | *Q*  (bushels of vegetables) | Variable  Cost | Fixed  Cost | Total  Cost | Marginal  Cost |
| 0 | 0 |  |  |  |  |
| 1 | 10 |  |  |  |  |
| 2 | 19 |  |  |  |  |
| 3 | 27 |  |  |  |  |
| 4 | 34 |  |  |  |  |
| 5 | 40 |  |  |  |  |
| 6 | 45 |  |  |  |  |
| 7 | 49 |  |  |  |  |
| 8 | 52 |  |  |  |  |

**Table 3**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Q  (# bags) | Total  Cost | Fixed  Cost | Variable  Cost | Marginal  Cost | Average  Total Cost | Average  Var. Cost |
| 0 | $200 |  |  |  |  |  |
| 1 | 240 |  |  |  |  |  |
| 2 | 300 |  |  |  |  |  |
| 3 | 380 |  |  |  |  |  |
| 4 | 480 |  |  |  |  |  |
| 5 | 600 |  |  |  |  |  |
| 6 | 740 |  |  |  |  |  |
| 7 | 900 |  |  |  |  |  |
| 8 | 1,080 |  |  |  |  |  |

**Figure 1**

