Last Name (1)\_\_\_**KEY**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ First Name (1)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Microeconomics Homework Part 2 (of 3)

Principles of Economics with Dr. Beck

Module 6

1) At a price of $1 each, a local supermarket sold 50 avocados per week. After a price increase to $1.25, they sold 40 per week. (5 points)

i) Using the midpoint formula, calculate the elasticity of demand for avocados. (4 points)

**-1**

ii) Is the demand for avocados elastic or inelastic? (1 points)

**Neither…it’s actually unitary elastic!**

2) For each of the following pairs of goods, which one would you expect to have a higher elasticity of demand? (1 point each, 5 points total)

i) a required textbook or a mystery novel

**Mystery Novel**

ii) 52 inch Samsung HDTV’s or HDTV’s in general

**Samsung**

iii) heating oil during the next six months or heating oil during the next five years

**Next five years**

iv) lemonade or water

**Lemonade**

v) electricity or concert tickets

**Concert tickets**

3) The elasticity of demand for entry into your amusement part is -0.7. If your goal is to increase total revenue, should you increase or decrease the price? Why? (2 points)

**Increase price. Demand is inelastic.**

4) A recent study found that as the price of marijuana increased from $300 per ounce to $400 per ounce in a local area, the amount of alcohol sold in that area increased from 50,000 liters per month to 60,000 liter per month. (6 points)

i) Calculate the cross price elasticity between marijuana and alcohol. (4 points)

**0.63**

ii) According to your calculation above, are these two goods substitutes or compliments? How did you know? (2 points)

**Subs. The coef is positive.**

5) Consider the following chart illustrating the connection between hours Claudia spends studying (variable input) and her score on the next exam (total product). (6 points total)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | E |
| Number of  | Fixed Input | Total Product | Marginal  | Avg Prod |
| hours spent | (Book and  | (# of test questions | Product of  | of study |
| studying | Notes) | answered correctly) | study time | time |
| 0 | 1 | 5 | \*\*\*\*\* | \*\*\*\*\* |
| 1 | 1 | 7 | **2 question** | **7/1** |
| 2 | 1 | 11 | **4** | **11/2** |
| 3 | 1 | 18 | **7** | **18/3** |
| 4 | 1 | 29 | **11** | **29/4** |
| 5 | 1 | 39 | **10** | **39/5** |
| 6 | 1 | 45 | **6** | **45/6** |
| 7 | 1 | 47 | **2** | **47/7** |
| 8 | 1 | 47 | **0** | **47/8** |

In the above chart fill in the empty boxes for the marginal product and avg product in columns D and E. (4 points)

Does this production process exhibit diminishing marginal returns to studying at any point? If so, at what point? (2 points)

**Yes, after the forth hour**

6) Assume the output per day in our factory depends on our level of labor and capital. This relationship can be represented by the production function Q=4K1/2L1/2. Further assume we are operating in the short-run where K is fixed at one unit. (6 points total)

i) Does this production function exhibit diminished marginal product in labor? If so, at what point does marginal product begin to decrease? (2 points)

**Yes. Immediately.**

ii) What is MPL of the 4th worker? Be sure to include the unit of measurement in your answer. (2 points)

**TP with 3 units of L = 4\*3^(1/2)= 6.93 units**

**TP with 4 units of L = 4\*4^(1/2)= 8 units**

**So the MP of 4th worker is 1.07 units of output.**

iii) We can sell our output for $10 each, and each unit of labor costs $5 per unit. What is the optimal level of labor to hire? (2 points)

**As long as the marginal benefit of hiring a worker exceeds the cost of the worker, hire him/her!**

**Excel can help, here:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Units of L** | **TP** | **MP of L** | **Marg Benefit of L** | **MC per worker** |
| **0** | **0** | **----** | **----** | **----** |
| **1** | **4 units** | **4 units** | **$40.00** | **$5** |
| **2** | **5.66** | **1.66** | **16.57** | **5** |
| **3** | **6.93** | **1.27** | **12.71** | **5** |
| **4** | **8.00** | **1.07** | **10.72** | **5** |
| **5** | **8.94** | **0.94** | **9.44** | **5** |
| **6** | **9.80** | **0.85** | **8.54** | **5** |
| **7** | **10.58** | **0.79** | **7.85** | **5** |
| **8** | **11.31** | **0.73** | **7.31** | **5** |
| **9** | **12.00** | **0.69** | **6.86** | **5** |
| **10** | **12.65** | **0.65** | **6.49** | **5** |
| **11** | **13.27** | **0.62** | **6.17** | **5** |
| **12** | **13.86** | **0.59** | **5.90** | **5** |
| **13** | **14.42** | **0.57** | **5.66** | **5** |
| **14** | **14.97** | **0.54** | **5.44** | **5** |
| **15** | **15.49** | **0.53** | **5.25** | **5** |
| **16** | **16.00** | **0.51** | **5.08** | **5** |
| **17** | **16.49** | **0.49** | **4.92** | **5** |
| **18** | **16.97** | **0.48** | **4.78** | **5** |
| **19** | **17.44** | **0.47** | **4.65** | **5** |
| **20** | **17.89** | **0.45** | **4.53** | **5** |

**We can see in the above, the MB is greater than the MC for workers through the 16th worker. For the 17th, the MC>MB. So the optimal level of labor is 16 workers.**