Econ 2016: Principles of Microeconomics

Homework 7 (Total score: 20 Points)

Due Date: Oct 19 (Wed), 12:40 PM

1. Multiple Choice (9 points)

D 1. (1 point) Perfectly competitive firms must make all of the following decisions (except)
  A. how much output to supply. ✓
    B. which production technology to use.
    C. how much of each input to demand.
    D. what price to charge for their output.

B 2. (1 point) Refer to the figure 1. The marginal product of the second worker is _____ lawns mowed.
    A. 3   B. 5   C. 8   D. 11

A 3. (1 point) Refer to the figure 1. The average product with two workers is _____ lawns mowed. $\frac{TP}{2} = \frac{8}{2}$
    A. 4   B. 5   C. 5.5   D. 11

8, A 4. (1 point) The marginal products of the first, second, and third workers are 20, 12, and 8, respectively. If four
    workers can produce 45 units of output, then the marginal product of the fourth worker is _____.
    A. 15   B. 30   C. 40   D. 67.5   E. 5.   20. 12. 8.   A. 5. B. 15 C. 20 D. 30

5. (3 points) Assume that capital and labor are complementary inputs. If the firm increases the amount of capital
    it employs, this would __*C*__.
    A. cause the firm to move down along the MP schedule for labor. $K\uparrow$
      B. cause the firm to move up along its MP schedule for labor. $\Rightarrow MP\ L\uparrow$
      C. shift the firm's MP schedule for labor to the left.
      D. shift the firm's MP schedule for labor to the right. $\Rightarrow MP_L\downarrow$
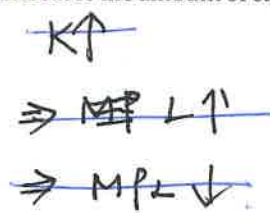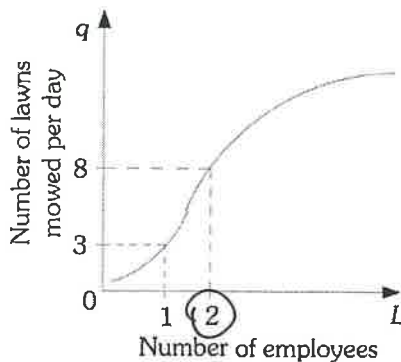
Figure 1: Question 1.2-1.3

$$\frac{MP_L = 10}{W} = \frac{MP_K = 20}{r}$$

A

6. (1 point) A firm is operating such that the marginal product of labor is 10 and the marginal product of capital is 20. The firm is minimizing its costs only if

$10r = 20W$

$r = 2W$

$W = \frac{1}{2}r$

  A. the wage is half the rental rate.

  B. the rental rate is half the wage.

  C. since capital is more productive than labor, the firm must be minimizing cost.

  D. Given this information the firm can't be minimizing cost under any circumstances.

C

7. (1 point) Diminishing marginal returns implies:

  A. decreasing average variable costs.

  B. decreasing marginal costs.

  C. increasing marginal costs.

  D. decreasing average fixed costs.

2. **Calculation Questions (6 points):** Please fill the following tables.(Please keep each of your answer as an integer.) I listed equations that you may need: $MC = \frac{\Delta TVC}{\Delta Q}$; $AVC = \frac{TVC}{Q}$; $TC = TVC + TFC$; $AFC = \frac{TFC}{Q}$

Table 1: Question 2

$MC = \frac{\Delta TVC}{\Delta Q}$

$50 = \frac{}{1}$

Q_{output}	TVC	MC	AVC	TFC	TC	AFC	ATC
0	0	0	0	100	100	/	/
1	50	50	50	100	150	100	150
2	90	40	45	100	190	50	95
3	140	50	46.67	100	240	33.3	80
4	200	60	50	100	300	25	75
5	270	70	54	100	370	20	74

/5

3. **Short-Answer Question (5 points):** Please show that: To maximize firm's long-run profit, the optimal output should satisfy the condition: $P = SRMC = SRAC = LRAC$. (Tips: You need to show three equations held separately, each proof having 1.5 scores. The rest 0.5 score is given to the conclusion.)

See the in-class Notes L9.