



B.E. International Program

Faculty of Economics, Thammasat University



EE 211 Principle of Microeconomics (Semester 1/2020)

Quiz 4

1. Suppose that the short-run total cost is represented by the following equation:

$$TC = Q^2 + 5Q + 20$$

- 1.1. (2 points) Derive the equation for average variable costs (AVC). [Hint: You need to first derive the total variable cost function.]

$$TVC = Q^2 + 5Q ; TFC = 20$$

$$AVC = \frac{TVC}{Q} = Q + 5$$

- 1.2. (4 points) Fill in the blanks in the following table.

Q	TFC	TC	ATC	MC
0	20	20	n.a.	n.a.
1	20	26	26	6
2	20	34	17	8
3	20	44	14.67	10
4	20	56	14	12

- 1.3. (2 points) From the above table, explain the relationship between ATC and MC as the output (Q) increases. Is ATC increasing or decreasing? Why?

As Q increases, ATC is decreasing because $MC < ATC$.

- 1.4. (2 points) If the fixed cost increases by \$5, explain how ATC and MC curves would change. You may use graph to illustrate your answer.

$$\text{New } TC = Q^2 + 5Q + 25$$

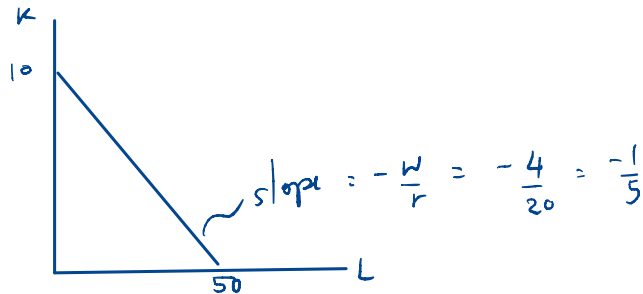
$$\text{New } ATC = Q + 5 + \frac{25}{Q}$$

$\therefore$ ATC curve shifts up, but MC does not change.

2. Suppose that the per unit price of labor (w) and price of capital (r) are given by \$4 and \$20, respectively. The producer would like to maximize his output (Q), where $Q=f(L,K)$, under the constraint that the total cost is fixed at \$200.

2.1. (4 points) Draw the isocost curve where K is on the y-axis and L is on the x-axis.

Determine the slope of the isocost.

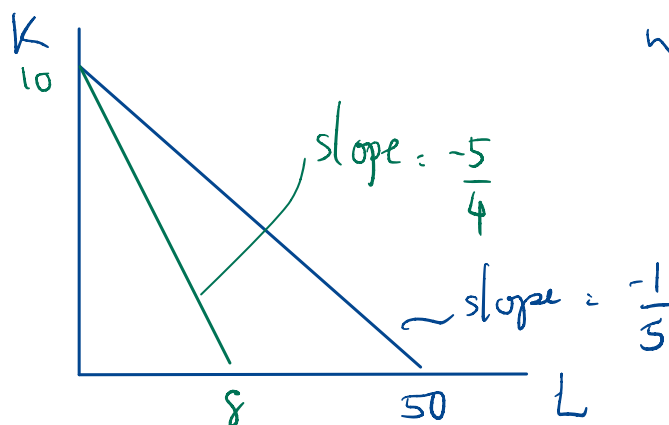


2.2. (2 points) State the equilibrium conditions that characterize the optimal input combination of labor and capital (L^* , K^*).

$$1. 4L^* + 20K^* = 200$$

$$2. MRTS = -\frac{MP_L}{MP_K} = -\frac{w}{r} = -\frac{1}{5}$$

2.3. (4 points) Draw another diagram to illustrate the change in the equilibrium when w increases to \$25, given that everything else remains the same.



$$w' = 25 \rightarrow \frac{w'}{r} = \frac{25}{20} = \frac{5}{4}$$