

EE320  
Semester 2 /2020

H.W. #3

INSTRUCTION:

You can work individually or as a group (with the maximum of 4 people).

If you work in group, group work will be graded as a group and please do as the followings:

- (a.) you must hand in a full copy of the group work in each own handwriting.
- (b.) please state each member of your group and your name on your work.

Please save your file as “studentid\_firstname\_hw3.pdf”, for example, “4904641234\_sunsiree\_hw3.pdf” and hand in your work in the google classroom by [Saturday, June 5, 2021, midnight.](#)

CHAPTERS:

Chapter 9(Optimization with Constraint: More-Than-One Independent Variable Cases), Chapter 10(Integration)

DETAILS:

(A.) Please work on “**PRACTICE PROBLEM SET 7**(Constrained optimization problem)”

**Question: 3, 5, 6, and 7**

It is suggested for you to also practice on other questions in this problem set to prepare for the final exam. But, only the questions stated above are to be handed in.

(B.) Please work on “**PRACTICE PROBLEM SET 8**(Integration)”

**Question 1, 4, and 8**

### (C.) Additional Question

Company beBrownie sells brownie in a competitive market. The price of brownie is  $P$ . The firm needs two factors of production, labor ( $L$ ) and capital ( $K$ ). Market wage for labor and rent for capital are  $w$  and  $r$ , respectively.

To produce brownie, company beBrownie uses production function  $Q = F(L, K) = L^{\frac{1}{4}}K^{\frac{1}{2}}$ .

**Question 1** How many labor and capital should beBrownie employ in order to maximize the profit? Please state the optimization problem, find FOCs and solve for *unconditional factor demand functions*. Also check SOC.

**Question 2** Now suppose that beBrownie has an advanced order that it needs to bake the brownie  $Q_0$  units.

(a.) How many labor and capital should beBrownie employ in order to minimize its cost? Please state the optimization problem, write the Lagrangian function, find FOCs and solve for *conditional factor demand functions*. Also check SOC.

(b.) How does rent relate to unconditional demand for labor? How does rent relate to conditional demand for labor? Are the two relations in the same direction?

Briefly explain the intuition behind the patterns of these relations.