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Assignment 2

1. $q = f(K, L)$ in long run = no fixed factor , $MP_L = 6$ $MP_K = 8$

drop K, get L

a) $MRTS = \frac{\Delta K}{\Delta L} = \frac{MP_L}{MP_K} = \frac{6}{8} = 0.75$ #

marginal rate of technical substitution (slope of Isoquant)

∵ In order to keep the level of output the same, this firm needs to sacrifice 0.75 units of capital (K) and get 1 unit of labor back. #

∵ Cost - minimization condition is MRTS = MRms slope of isocost

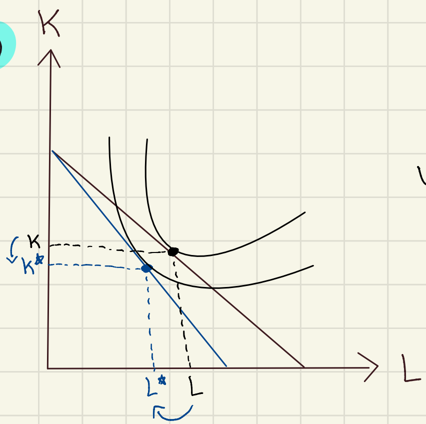
slope of Isoquant

$$\frac{MP_L}{MP_K} = \frac{w}{r} \rightarrow \frac{MP_L}{w} = \frac{MP_K}{r} \rightarrow \frac{6}{3} = \frac{8}{r} \rightarrow r = 4$$

wage rate

at q_0, $r = \frac{3}{0.75} = \$4$ #

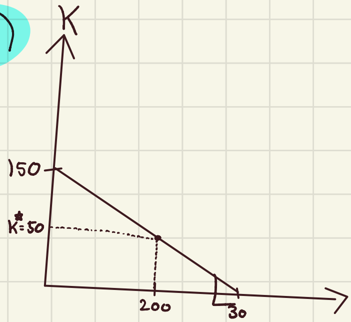
MRTS

b) 

Wage Changes $3 \rightarrow 4$

(2.) $q = (K, L)$ in long-run, require output = 3000

a)



$Q^* = 3000$ $\quad TC = L \cdot w + K \cdot r$

$= 200(10) + 50(20)$

$= 3000$

find intercept: $K = 0 \rightarrow 3000 = 10L \rightarrow L = 300$

$L = 0 \rightarrow 3000 = 20K \rightarrow K = 150$

use to graph

∵ cost minimization condition $\rightarrow$ MRTS = MRms

$\left|\frac{\Delta K}{\Delta L}\right| = \frac{w}{r}$

$\left|\frac{-150}{300}\right| = \frac{10}{20} = \frac{1}{2}$ #

give 1 K gain 2 L

∴ The optimal choice in order to minimize the cost and keep the level of output, firm sacrifice 1 capital (K) and get 2 labor (L)

$q(K^*, L^*) = q(50, 200)$ #

b) MP_L of 200^{th} labor = ?

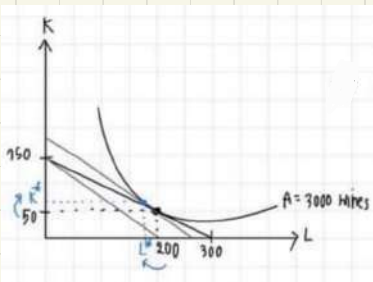
$\rightarrow \dfrac{MPL}{MPK} = \dfrac{w}{r}$

$MPL = \dfrac{w}{r} \cdot MPK$

$= \dfrac{10}{20} \cdot 8$ MPK of 50th K

$= 4.4 = 16$ #

c)



$\rightarrow$ (w)

Input for L increases

$10 \rightarrow 15$

$3000 = 15L + 20K$

when $L = 0$: $3000 = 20K$; $K = 150$

$K = 0$; $3000 = 15L$; $L = 200$

$\because$ when $w\uparrow$, in order to keep the same level of output. Using less labor but more capital.

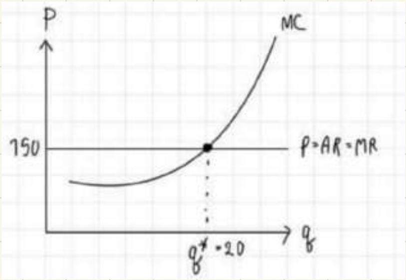
The production becomes more capital-intensive #

d). In short-run production, at least 1 factor is fixed as firms take time to expand (K)

In long-run production, all FOP are variable and can be adjusted.

3. Perfectly competitive, 150/unit,

a.)



$\because$ Profit-maximization condition

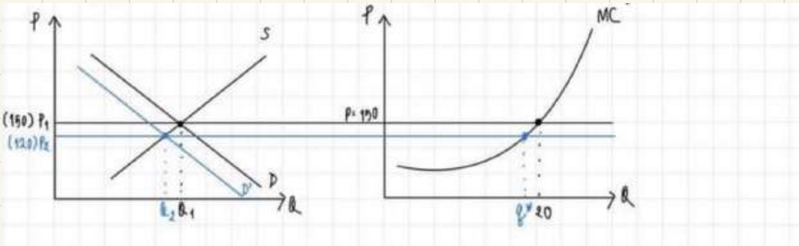
: MC=MR

b.) $q^* = 20$ $ATC = 180$ $AFC = 60$

- $AVC = ATC - AFC = 180 - 60 = 120$ baht
- $TR = P \cdot q = 150 \cdot 20 = 3000$ baht
- $TC = ATC \cdot q = 180 \cdot 20 = 3600$ baht
- $\text{Profit} = TR - TC = 3000 - 3600 = -600$ baht

c.) Yes the firm still should stay in the short-run market even though facing loss. This is because the firm is in the least lost situation where $P > AVC$. The difference btw P and AVC still can use for paying the fixed costs since in short-run, fixed factors can't be adjusted.

d.)

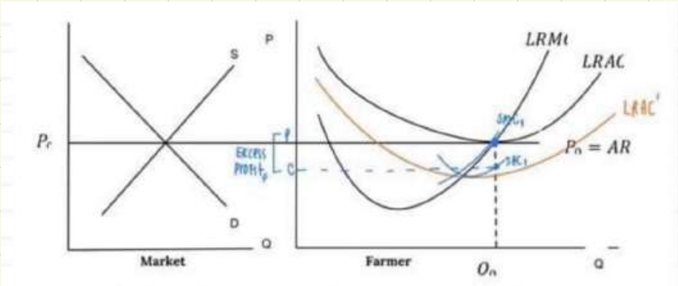


∵ when price market drops from 150 ⇒ 120, the equilibrium quantity and profit will be drop. now P= AVC, keep producing at q^* or stop are indifferent.

4.) long-run eqbm, perfectly competitive

a.) Subsidy will decrease TC. This makes LRAC drops. Since farmer is a price taker in the perfect competition, the competitive price and eqbm quantity remain constant. So, LRMC has no chance as there is no change in q.

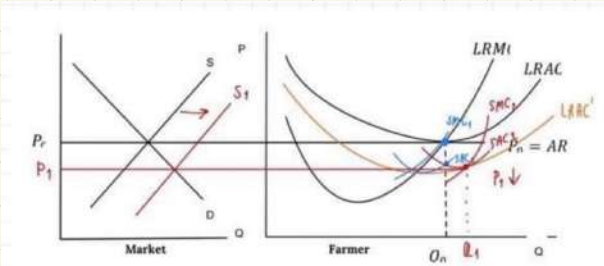
b.) No, because the profit maximization is when P= LRMC. Both P and LRMC do not change, the optimal quantity to maximize profit will be the same (Qo)



when LRAC↓ SAC at Qo gives average cost C.

when P>C, there is " excess profit "

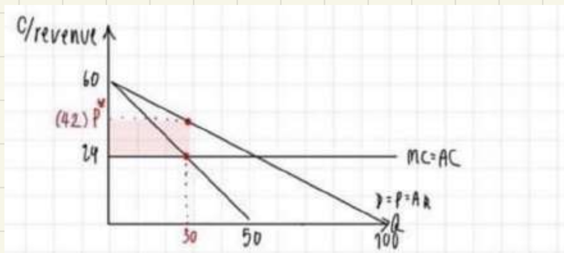
C. In long-run, excess profit will attract new farmers to market → supply ↑



when supply ↑, This leads to price drop in market.

This will increase the optimal quantity to maximize profit.

5. a.) when D is linear, MR is 2 times steeper



$= MR : P = 60 - 1.2Q$ #

b) Profit - maximizing condition

$MR = MC$

$60 - 1.2Q = 24$

$Q^* = 30$ units #

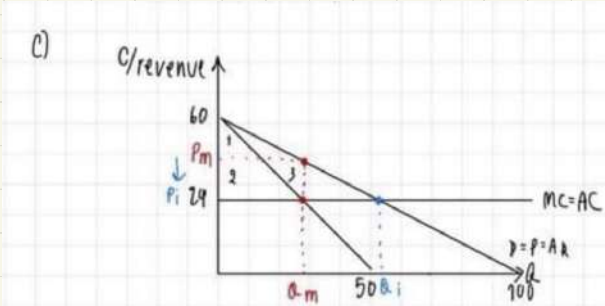
$P = 60 - 0.6(30) = 42$

$\because$ profit $(\pi) = (P - C) \cdot Q$

area shaded

$= (42 - 24) \cdot 30 = 540$ MB #

C.)



- Ideal price : P = MC
- quantity ↑ from Qm → Qi

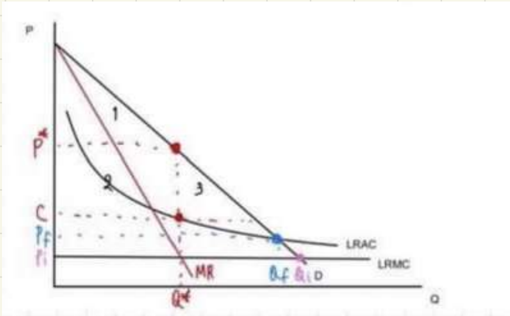
- before intervention
  CS = 1   PS = 2(CI)   DWL = 3

- after intervention
  CS = 1+2+3   PS = –   DWL = –

Therefore, Intervention prevents HL from taking the advantages from Consumer and removes the DWL.

6.

a.)



Eqbm Q^* : MR= LRmc

CS = 1
DWl = 3
producers profit = 2
$\hookrightarrow (P^* - c) \cdot Q^*$

b.) Lerner's index → $i = \frac{P - mc}{P} \rightarrow \frac{50-10}{50} = 0.8$ #

c.) Ideal price → P= mc → 10$ #

(at pi, Firm faces loss bc P< LRAC)

d.) Fair price → P= LRAC #

(at pf, no DWL bc firm is at normal profit).