Assignment 2
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1.a) $MRTS_{LR} = \frac{\Delta K}{\Delta L} = \frac{MP_L}{MP_K} = \frac{6}{8} = 0.75$

$\therefore$ firm needs to give up 0.75 units of capital and get 1 unit of labor back ✱

• cost - minimization condition : MRTS = MRMS

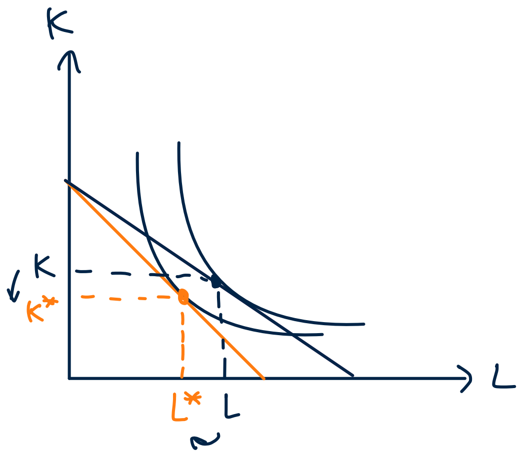
$$\frac{MP_L}{W} = \frac{MP_K}{r}$$

$$\frac{6}{3} = \frac{8}{r}$$

$$r = 4$$

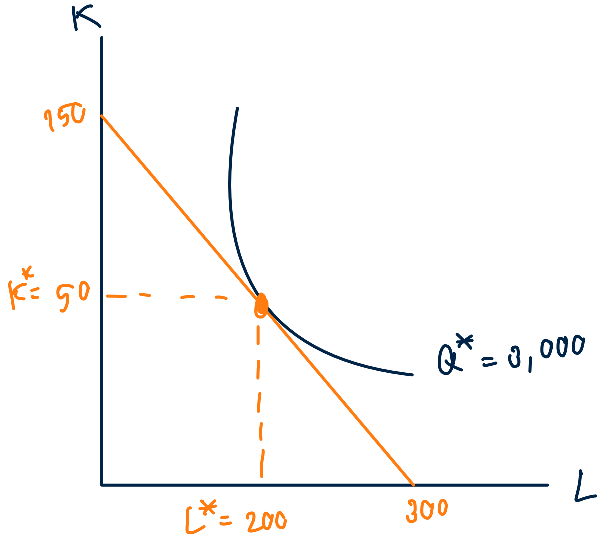
$\therefore$ at Q_0, $r = \frac{3}{0.75} = \$ 4$ ✱

1.b)



W ↑ ⇒ L ↓ , K ↑

2.a)



$Q^* = 3{,}000$

$TC = wL + rK$

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

$TC = 3{,}000$

- find K : $3000 = 20K$
  $K = 150$

- find L : $3{,}000 = 10L$
  $L = 300$

The optimal choice of (K^*, L^*) that minimize the cost and yeild the same amount of wine (3,000) when firm give up 1 K they gain 2 L $\Rightarrow q(K^*, L^*) = q(50, 200)$ #

$\therefore$ cost minimized when $|MRTS| = \left|\frac{\Delta K}{\Delta L}\right| = \frac{MP_L}{MP_K} = \frac{w}{r} = \frac{1}{2}$ #

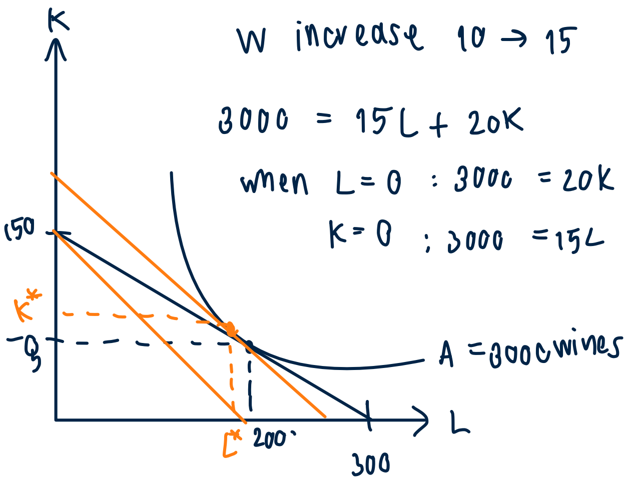
2.b) $\frac{MP_L}{w} = \frac{MP_K}{r}$

$MP_L = \frac{8(10)}{20}$

$= 4 \cdot 4 = 16$

MP_L of 200^{th} labor $= 16$ #

2.c)



w increase $10 \rightarrow 15$

$3000 = 15L + 20K$

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

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

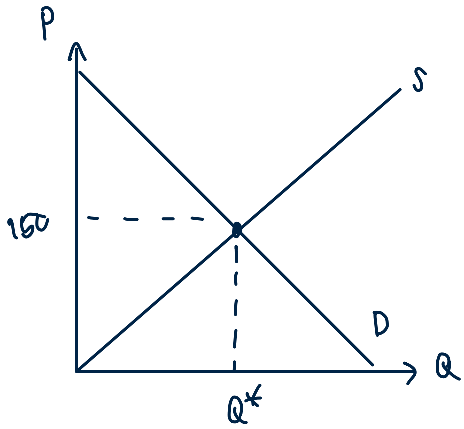
Using less labor but more capital,

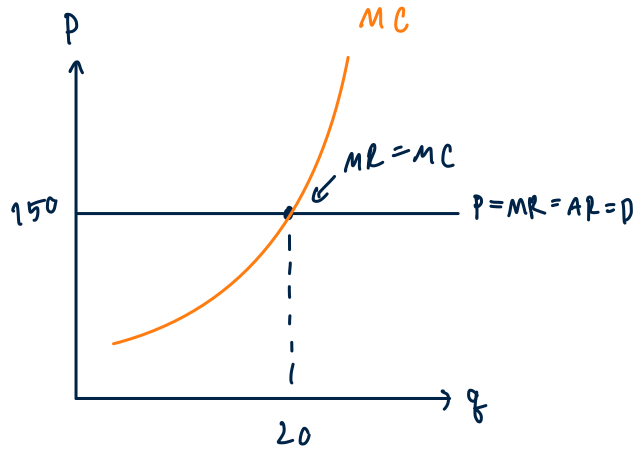
The production becomes more capital-intensive #

2.d) In SR, at least 1 factor is fixed

In LR, all FOP are variable and can be adjusted

3. a)





Profit-maximizing condition : MR=MC

3.b)

$$\boxed{\begin{aligned} ATC &= 180 \\ AFC &= 60 \end{aligned}}$$

$ATC = AFC + AVC$

$180 = 60 + AVC$

$AVC = 120$

$TC = ATC \times Q$

$= 180 \times 20$

$TC = 3{,}600$

$TR = P \times Q$

$= 150 \times 20$

$TR = 3{,}000$

profit $= TR - TC$
$= 3{,}000 - 36{,}000 = -600$ (lost)

3. c)

from 3.b), $AVC = 120$
$P = 150$

so $P > AVC$ meaning that the firm is in the least loss. The difference between P and AVC can compensate for the fixed costs in the short-run.

3. d) Now, the price is at 120 which equal to AVC (P=AVC)
In this case, either pay TFC or producing and selling at q^* cause the same lost. Therefore, firms can choose both ways.

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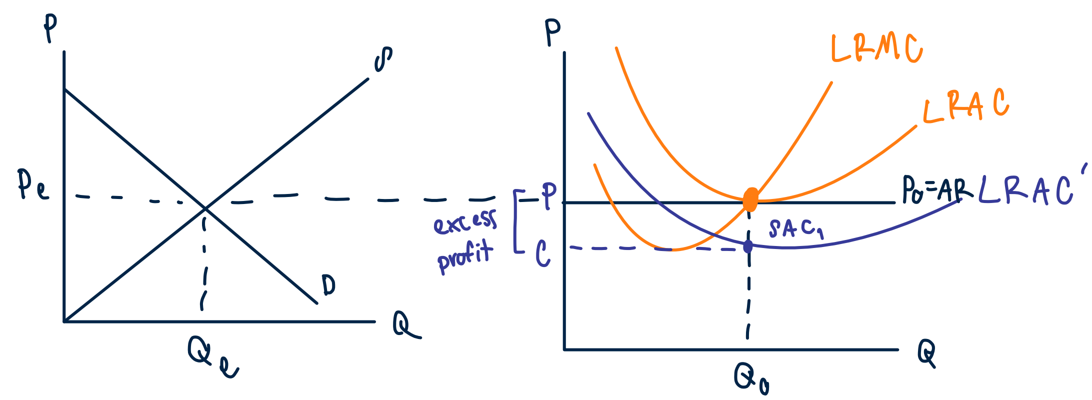
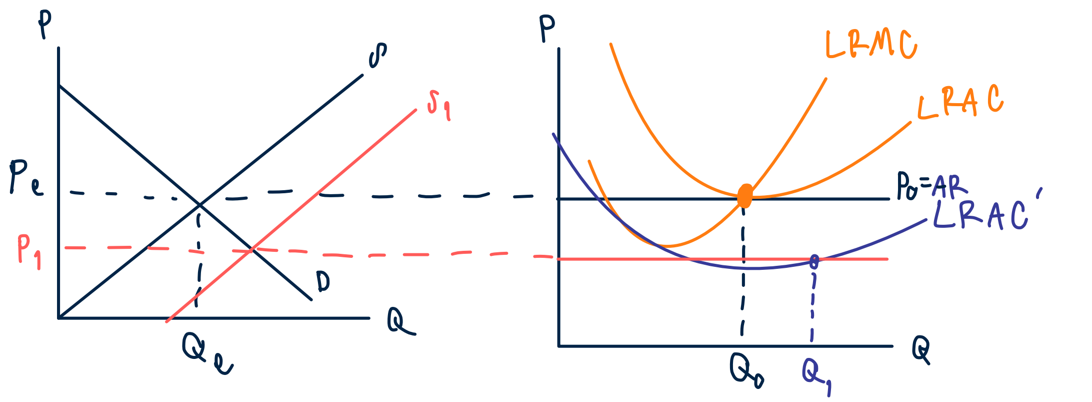
4. a) A lump sum subsidy given to farmer will reduce average total cost so, total fixed cost decrease. Additional decrease in fixed cost will not effect on variable costs and won't effect MC.

4. b)



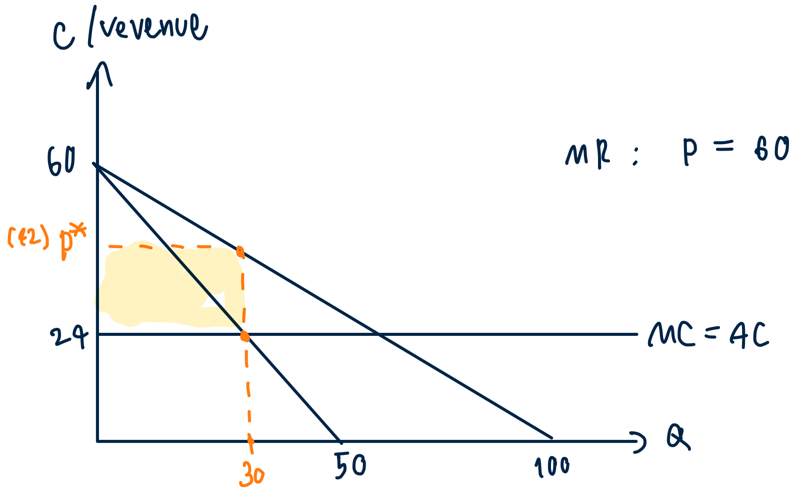
No because the profit maximization is when P = LRMC. Here both P and LRMC do not change, the optimal quantity to maximize profit will be the same (Q_0)

4. c)



In long Run, excess profit will attract new farmers to market → supply ↑ when supply increase leading to price drop in market.

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



MR : $P = 60 - 1.2Q$ #

5. b) profit-maximizing condition

$MR = MC$

$60 - 1.2Q = 24$

$Q^* = 30$ units #

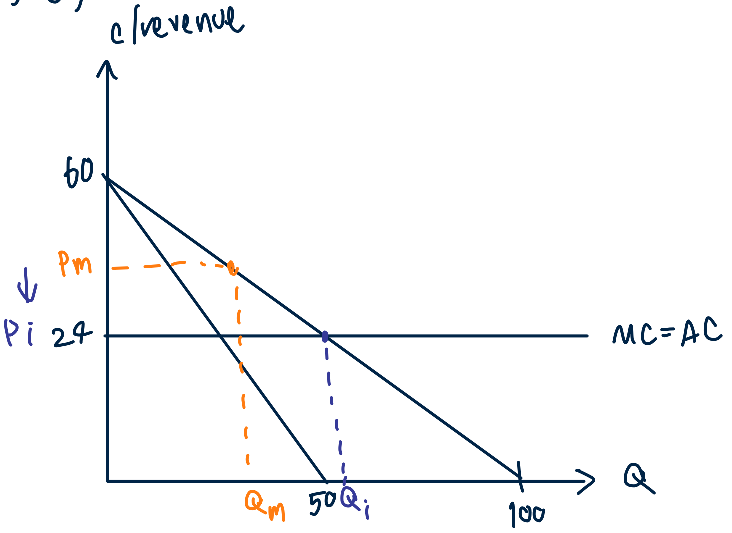
$P = 60 - 0.6(30) = 42$

$\therefore \pi = (P - C) \cdot Q$

$= (42 - 24) \cdot 30$

$= 540$ MB #

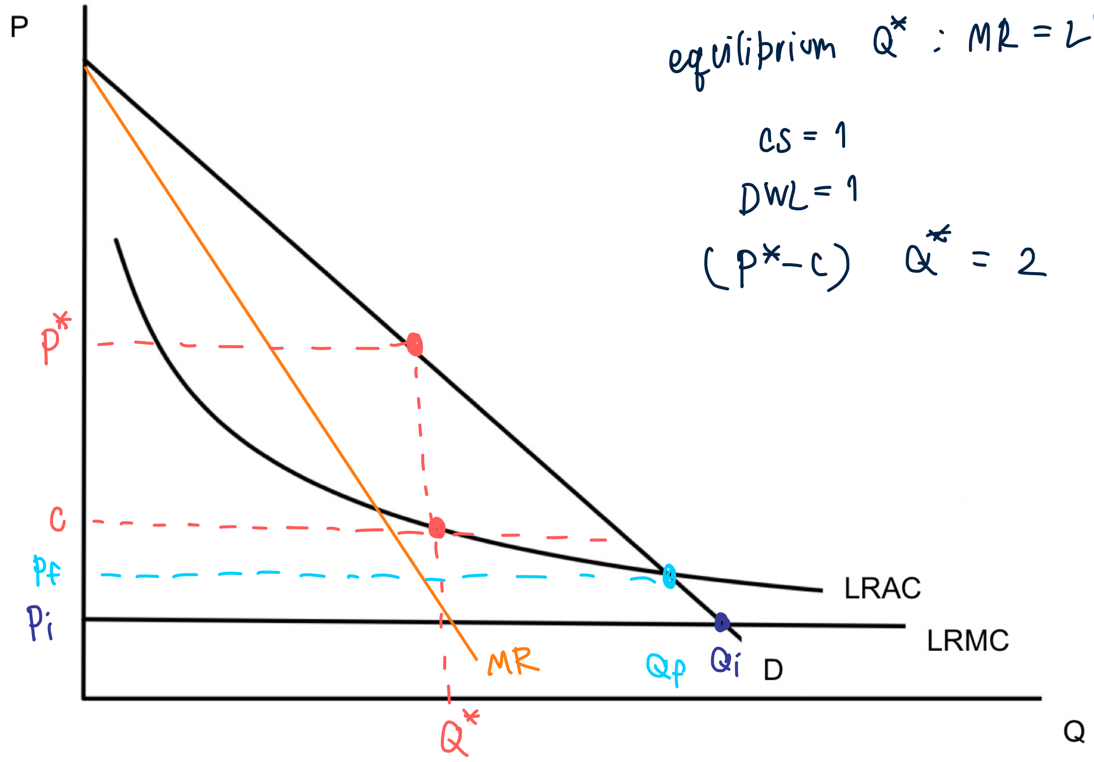
5. c)



- Ideal Price : P = MC
  - quantity ↑ from Qm → QI
- befor intervention
  - CS = 1   PS = 2 (π)
  - DWL = 3
- after intervention
  - CS = 1 + 2 + 3
  - PS = -
  - DWL = -

∴ Intervention prevents HL from taking the advantages from consumer and removes the DWL

6. a)



equilibrium Q^* : MR = LRMC

CS = 1

DWL = 1

$(P^* - c)\ Q^* = 2$

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

6. c) Ideal Price → P = MC ⇒ 10$ # (at P_i, Firm face loss)

6. d) Fair Price → P = LRAC # (at P_f, no DWL)