HW#11, Due May 6, 2021 Analyze the case the firm receives subsidy for the following two different cases to find out how the firm's quantity and profit change.
a) The government gives a lump sum subsidy of 20,000 bahts to each firm.
b) Suppose that the firm was producing 1,000 units and the government gives a subsidy of 20 bahts/unit so the total subsidy is also 20,000 bahts if the firm does not change its production of 1,000 units. Do you think, to maximize its profit with the subsidy of 20 bahts/unit, the firm will increase/decrease its production from 1,000 units? Does the firm receive higher profit? Does the firm receive more/less subsidy than 20,000 bahts?

a) Firm receives a lump sum subsidy of 20,000 Baht

$\longrightarrow$ TFC ↓

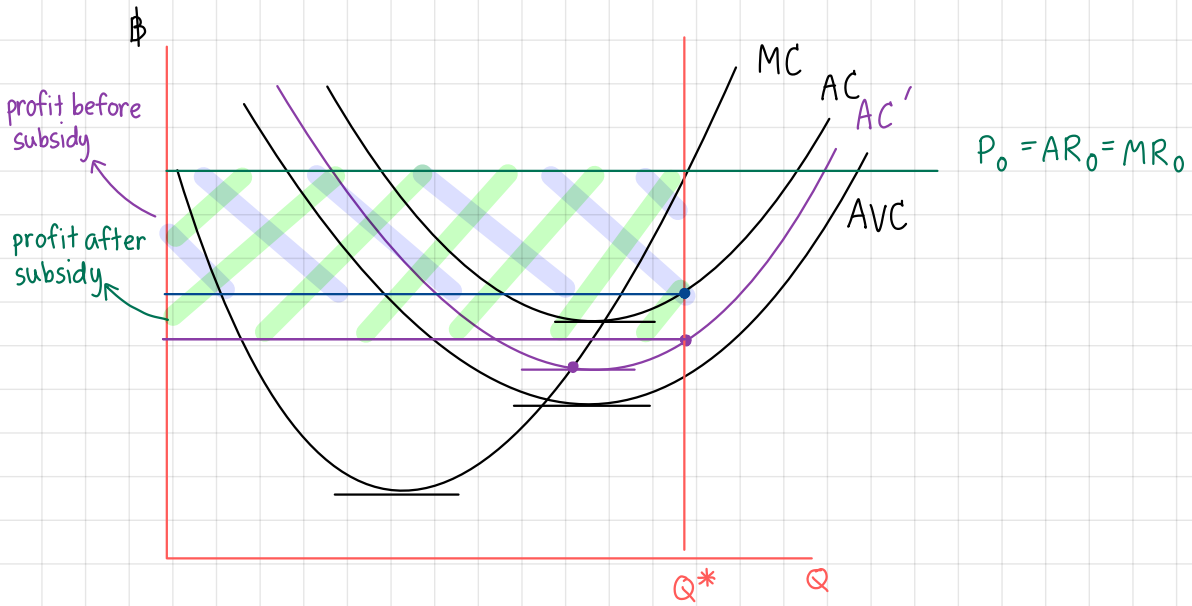
$TC(Q) = TFC(Q) + TVC(Q)$

$\frac{d}{dQ} TC'(Q) = TFC'(Q) + TVC(Q)$ → unchanged = MC unchanged

$= \frac{d}{dQ}(TFC(Q) - 20{,}000 + TVC(Q))$

$\frac{TFC'(Q)}{Q} = \frac{TFC(Q)}{Q} - \frac{20{,}000}{Q}$

$AFC'(Q) = AFC(Q) - \frac{20{,}000}{Q}$



- Eq. quantity Q^* does not change because MC and MR do not.

$\longrightarrow$ Q^* still satisfies the eq. conditions

However, profit ↑

$\longrightarrow$ amount of lower fixed cost = 20 k

Firm gain lum sum sub 20,000

TFC ↓

$TC(Q) = TFC(Q) + TVC(Q)$
$TC'(Q) \quad TFC'(Q) + TVC(Q)$

$AC(Q) = AFC(Q) + AVC(Q)$

$AC'(Q) = AFC'(Q) + AVC(Q)$

$AFC'(Q) = AFC(Q) - \frac{20,000}{Q}$

$TC(Q) = TFC(Q) + TVC(Q)$

$TC'(Q) = TFC'(Q) + TVC(Q)$

$TFC'(Q) = TFC(Q) - 20,000$

$AC(Q) = AFC(Q) + AVC(Q)$

$AFC'(Q) = AFC(Q) - \frac{20,000}{Q}$

$TC(Q) = TFC(Q) + TVC(Q)$

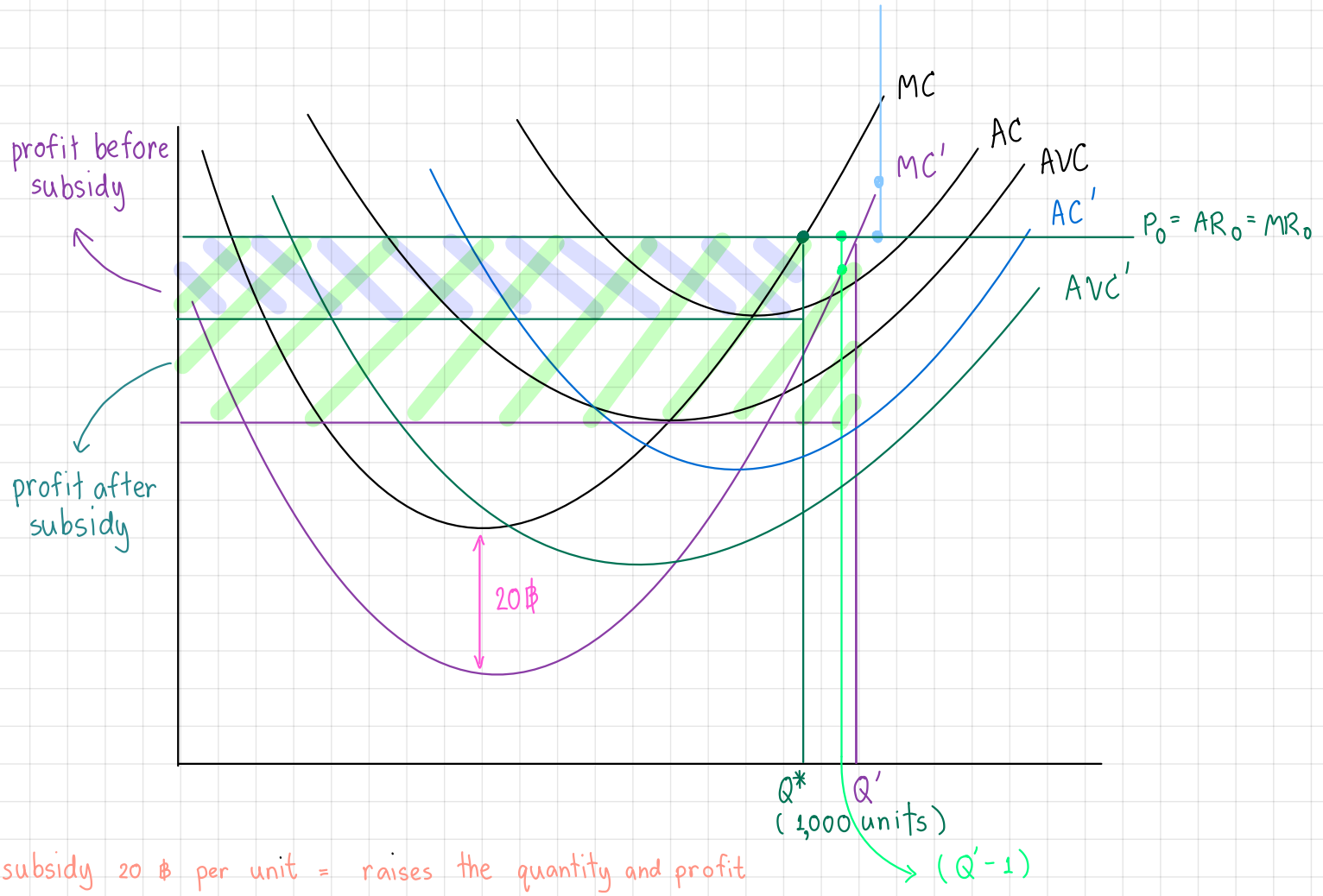
$TC'(Q) = TFC(Q) + TVC'(Q)$

$TVC'(Q) = TVC(Q) - 20Q$

$AVC'(Q) = AVC(Q) - 20$

$AC'(Q) = AVC - 20 + AFC = AC - 20$

$MC'(Q) = MC(Q) - 20$



subsidy 20 ฿ per unit = raises the quantity and profit → (Q' - 1)

before subsidy → Eq. = Q^*

where I) $MRC(Q^*) = MC(Q^*)$

II) slope $MR(Q^*) = 0 <$ slope $MC(Q^*)$

After subsidy → Eq. = Q'

where I) $MR(Q') = MC(Q')$

II) slope $MR(Q') = 0 <$ slope $MC(Q')$

$TC(Q) = TFC(Q) + TVC(Q)$

$TC'(Q) = TFC(Q) + TVC'(Q)$

$TVC'(Q) = TVC(Q) - 20Q$

$AVC'(Q) = AVC(Q) + 20$

$AC'(Q) = AF(Q) + AVC(Q) - 20$

$= AC(Q) - 20$

$TC(Q) = TFC(Q) + TVC(Q)$

$TC'(Q) = TFC(Q) + TVC'(Q)$
$= TFC(Q) + TVC(Q) - 20Q$

$AVC'(Q) = AVC(Q) - 20$

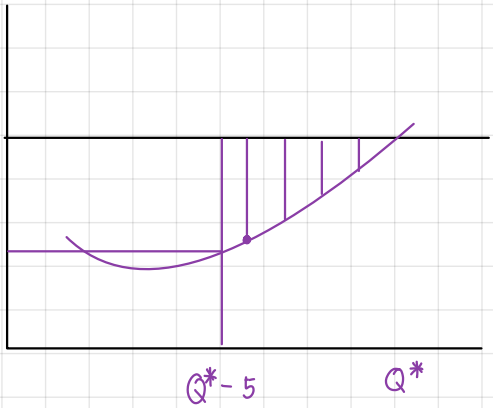
$AC'(Q) = AFC(Q) + AVC(Q) - 20 = AC(Q) - 20$

$MC'(Q) = MC(Q) - 20$

∴ The firm will increase its production to Q' (> 1,000 units) in order to maximize the profit. (gain higher profit)

The firm will gain subsidy more than 20k baht. according the quantity it produces.

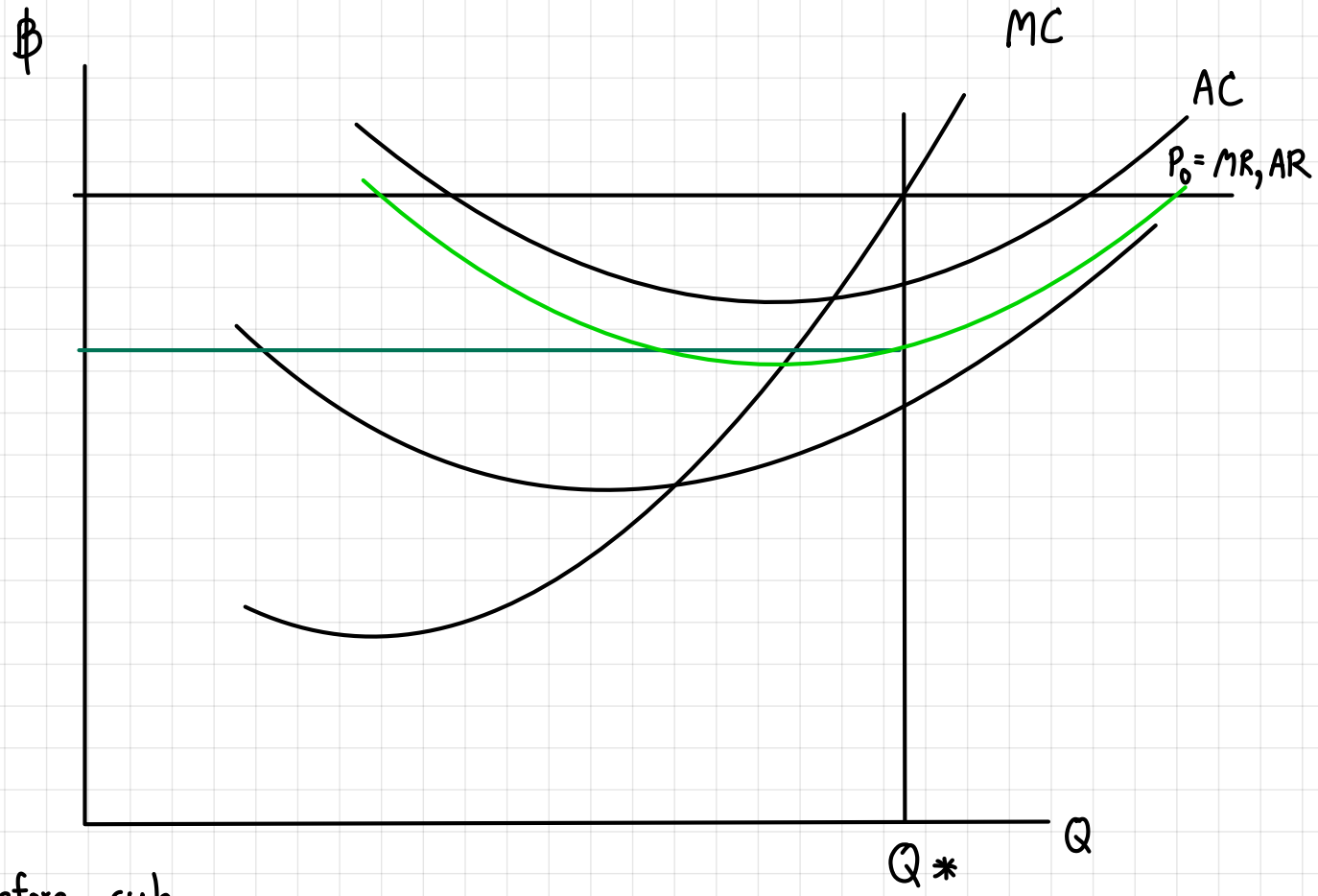
Nevertheless, the cost will be higher, and the firm will gain less revenue if the firm produces more than Q'



$P_0 = AR_0 = MR_0$

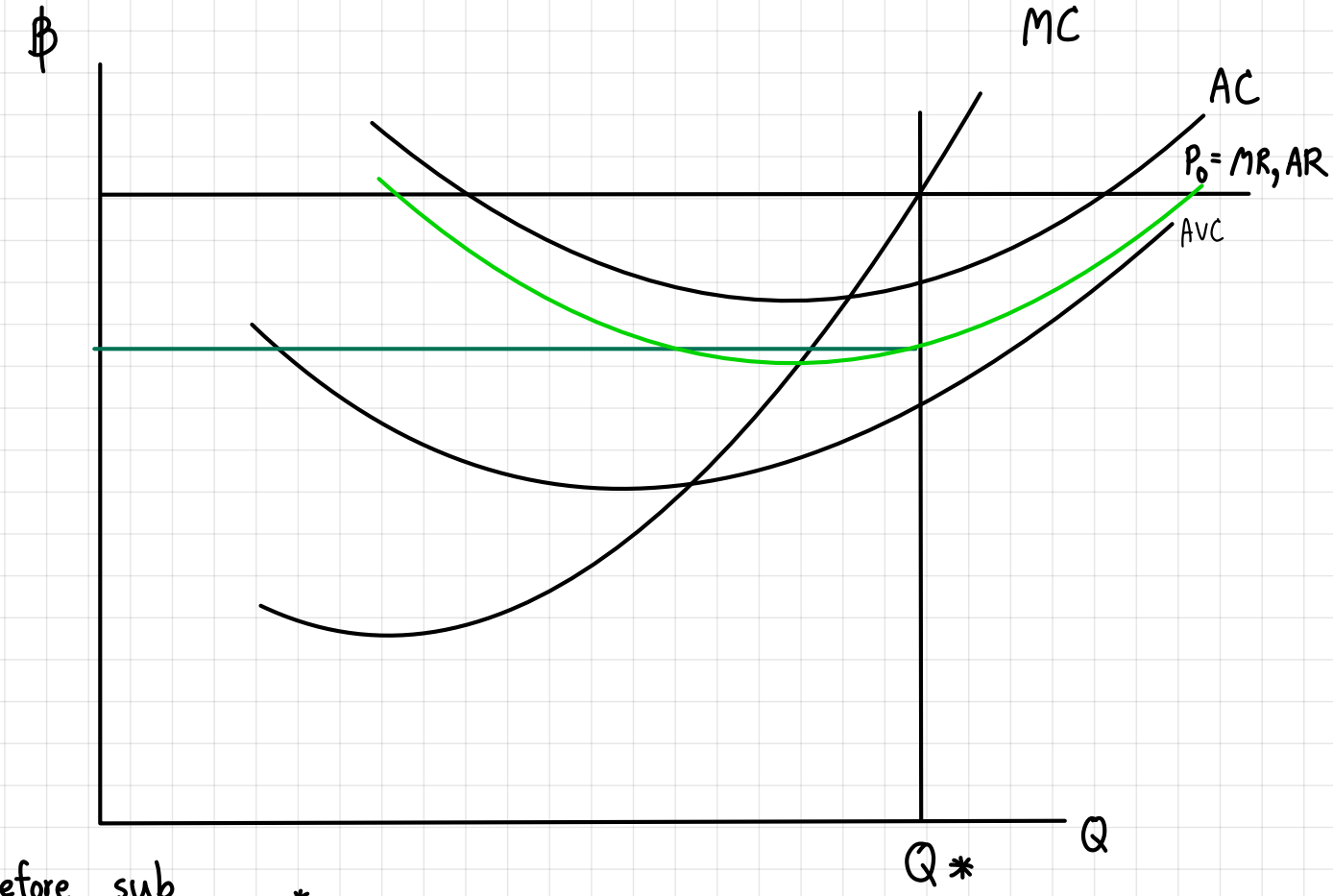
MR > MC ↑Q
MR < MC ↓Q
MR = MC stop
, slope MR < slope MC

	MR	MC	Marginal Profit
Q^*-5	10	6	4
Q^*-4	10	7	3
Q^*-3	10	8	2
Q^*-2	10	9	1
Q^*-1	10	9.5	0.5
Q^*	10	10	0



Before sub

1) $MR(Q^*) = MC(Q^*)$
2) s of $MR(Q)$ ($MC(Q^*)$



Before sub

1) $MR(Q^*) = MC(Q^*)$
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