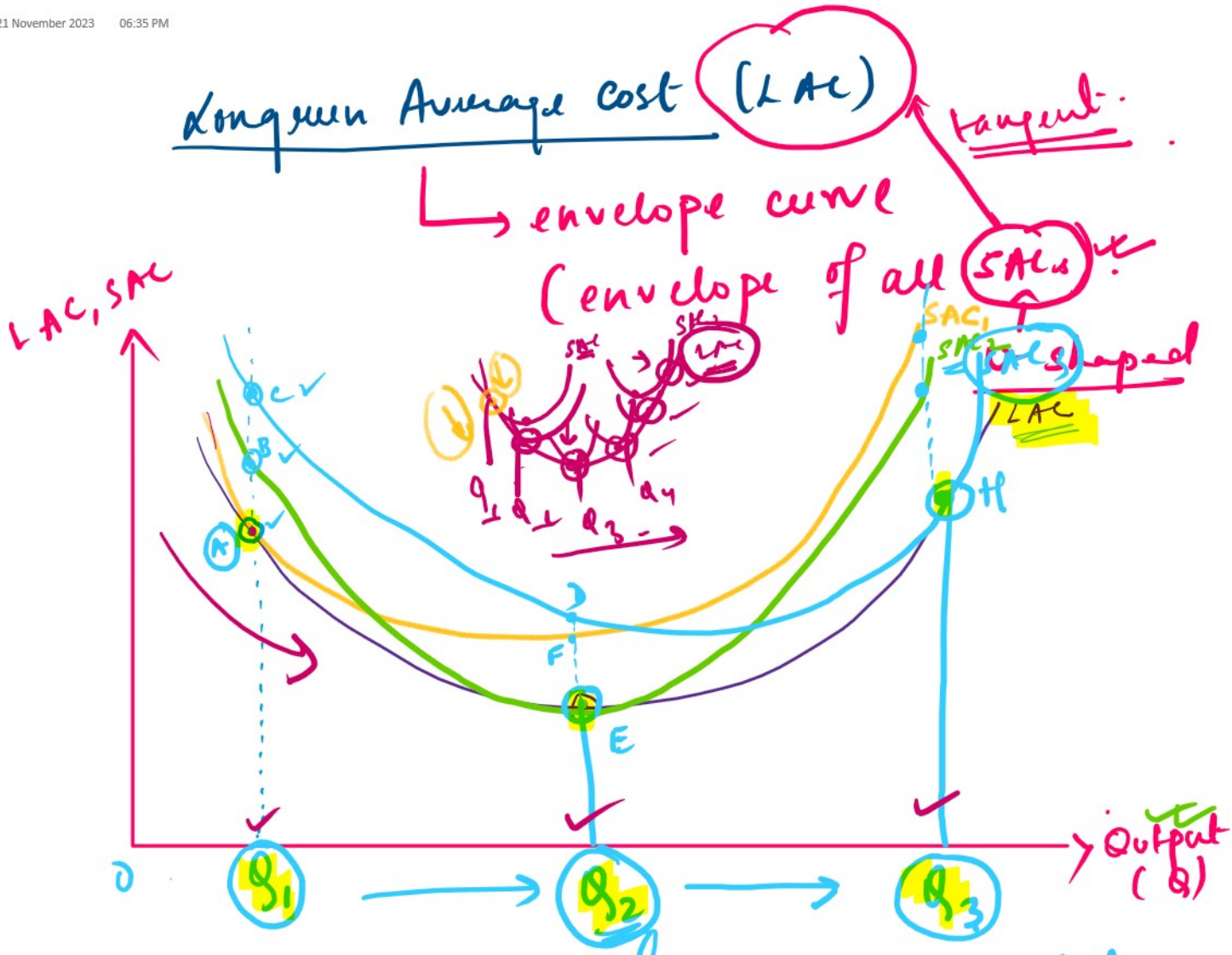
21 November 2023 06:35 PM

Longrun Average cost (LAC)

↳ envelope curve

(envelope of all SAC's)

Tangent.



Firm will produce Q_1 output at SAC, at pt A because SAC_1 is the min avg cost compared to SAC_2 and SAC_3.

- Definition of LAC.
- Derivation of LAC
- Why LAC is called envelope curve.

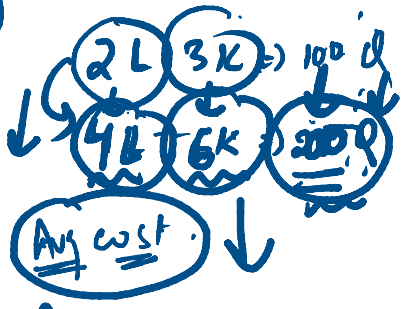
Relation between Returns to scale

Relation between (Returns to scale and LAC)

Scale ⇒ prod / output (Q)

when I am using factors of production like (L and K)

1. Increasing Returns to Scale (IRS) ✓
   - Economies of Scale ✓
   - → if you ↑ L and K by 10 %. then output level increases by more than 10%.
   - → decreasing cost ⇒ LAC curve falling.



2. Constant Returns to Scale (CRS) ↓ const AC (at the min AC).

2L, 3K → 100 Q
↓ ↓ ↓
4L, 6K → 200 Q

(Two times → Two times)

(Two times → less than)

3. Decreasing Returns to Scale (DRS)

↓

Diseconomies of Scale

↓

Increasing cost-

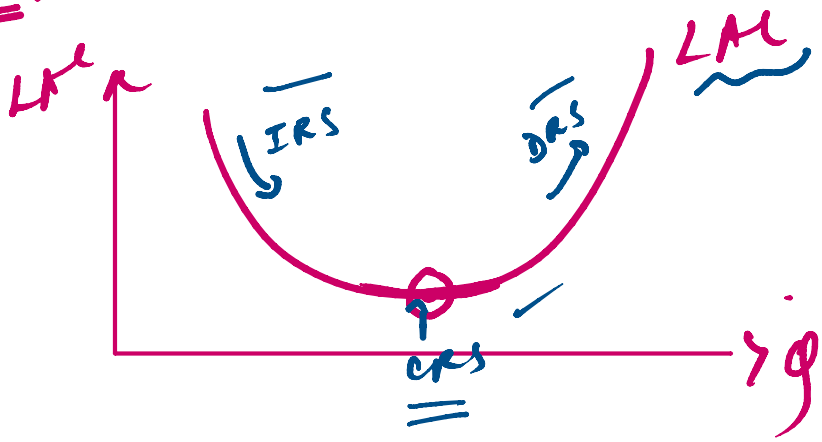
↓

LAC rising.

2L → 3K → 100 Q

4L → 6K → 160 Q

TC ↑ , AC ↑ (less than twice)



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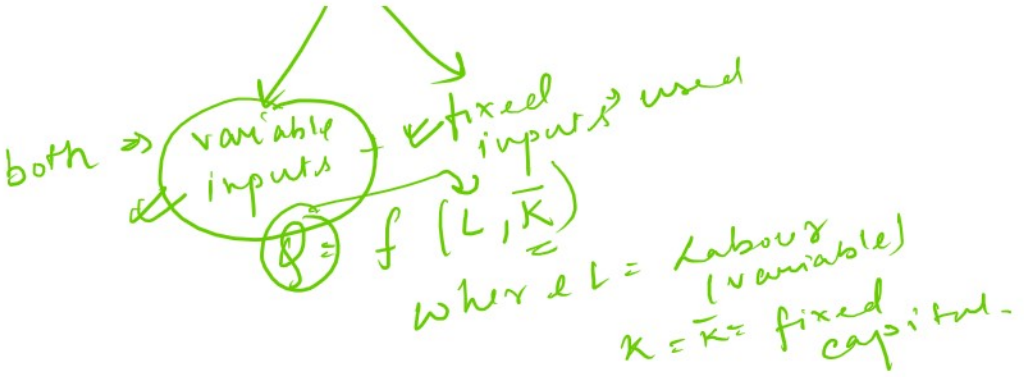
Theory of Production

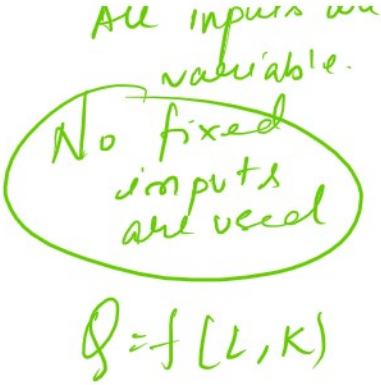
Short-run production

Long-run production

↓

All inputs are variable.





Short-run Production

↓ with one variable input → Labour.

$TP_L = Q$, $AP_L = \frac{TP_L}{L} = \frac{Q}{L}$

Total product, Avg product

and Marginal product of Labour

$$MP_L = \frac{\Delta Q}{\Delta L}$$

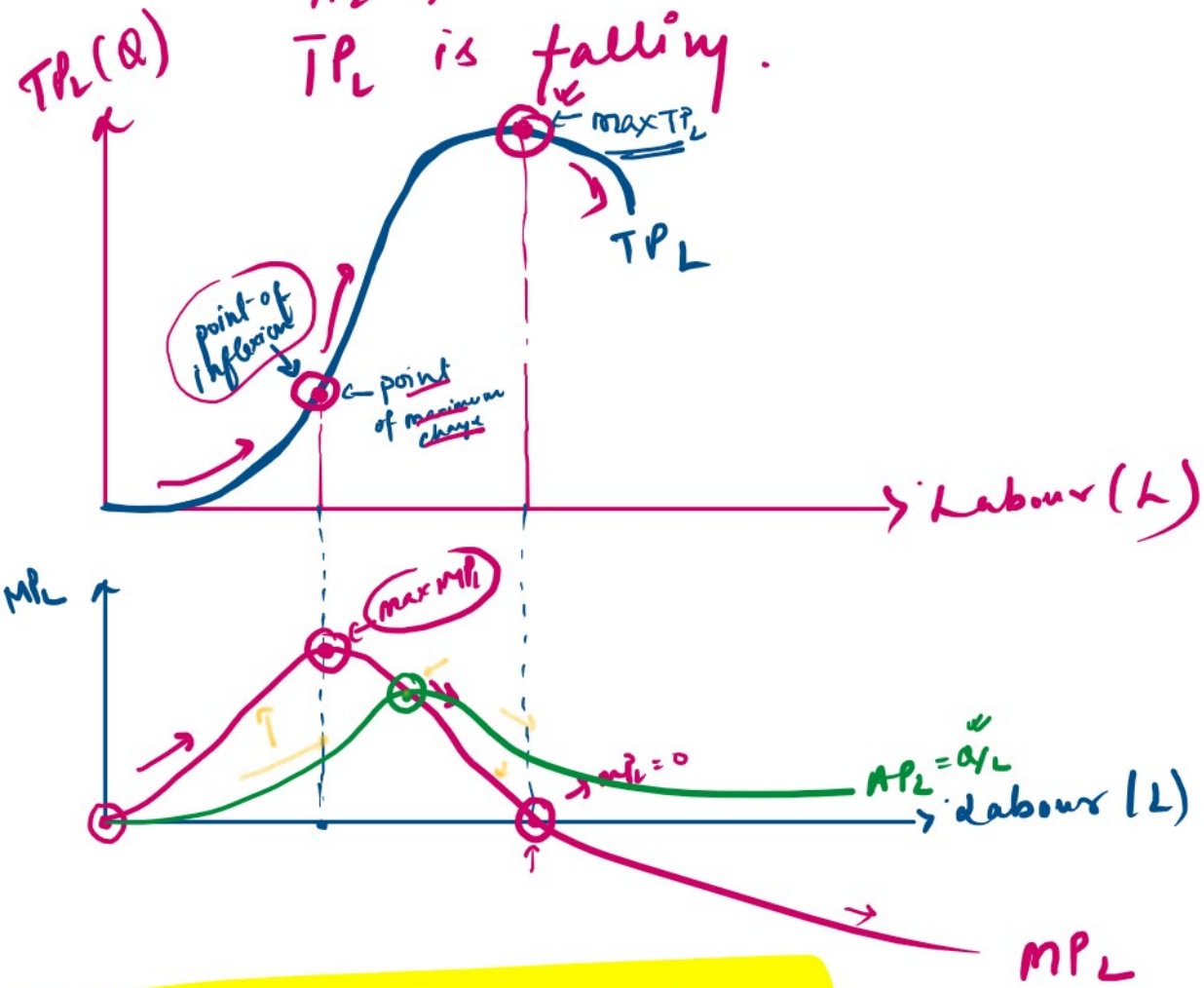
change in Q due to change in Labour by one unit.

Relation between TP_L and MP_L

fixed capital (Land)	Variable (Labour)	TP_L (Q)	$AP_L = \frac{Q}{L}$	$MP_L = \frac{\Delta Q}{\Delta L}$
10 Acres	0	0		
10 Acres	1	10	$\frac{10}{1} = 10$	$\frac{10-0}{1-0} = +10$ ✓
	2	25	$\frac{25}{2} = 12.5$	$\frac{25-10}{2-1} = +15$ ✓
	3	45	$45/3 = 15$	$\frac{45-25}{3-2} = +20$ ✓

10 Acres	2	25	$25/2 = 12.5$	2-1
	3	45	$45/3 = 15$ → $\frac{45-25}{3-2} = 20$	
	4	72	$72/4 = 18$ → $\frac{72-45}{4-3} = 27$	max MP_L
	5	105	$105/5 = 21$ → $\frac{105-72}{5-4} = 33$	
	6	105	$105/6 = 17.5$ → 0	MP_L
10 Acres	7	100	$100/7 = 14.28$ → $\frac{100-105}{7-6} = -5$	

TP_L first ↑ rises at increasing rate
TP_L ↑ rises at decreasing rate
TP_L reaches a maximum.
TP_L is falling.



Relation between MP_L and AP_L

(i) when AP_L is increasing throughout → MP_L is above AP_L ∴ $MP_L > AP_L$
(ii) when AP_L is at maximum point → $AP_L = MP_L$
(iii) when AP_L is falling → MP_L is below AP_L → $MP_L < AP_L$

(iii) when MP_L is falling $\Rightarrow$ MP_L is below AP_L $\Rightarrow$

Law of diminishing Marginal Product
or, Law of Variable Proportion.

all factors of production remaining fixed, if a firm increases the use of a variable input say Labour then the total productivity of Labour will gradually decrease. That is MP_L will first increase, then reaches max and then becomes negative.

This is Law of diminishing MP_L.