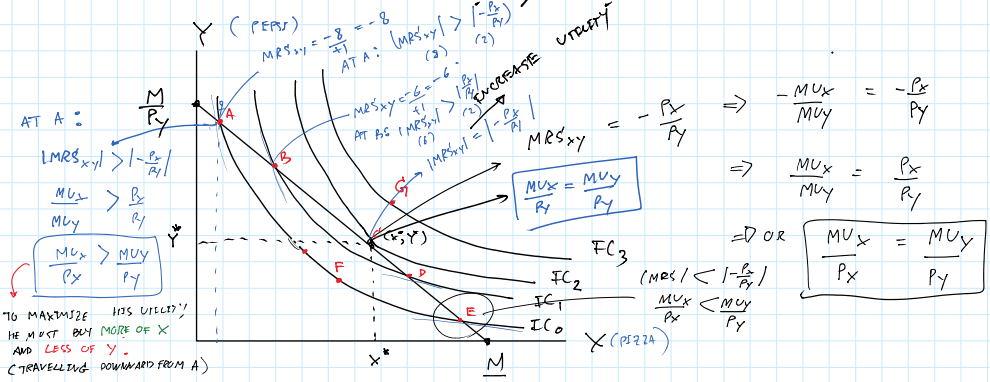
CONSUMER'S UTILITY MAXIMIZATION PROBLEM (UMP)

$$\max_{x,y} U(X,Y) \quad \text{SUBJECT TO} \quad P_x \cdot X + P_y \cdot Y = M$$

→ OBJECTIVE FUNCTION

→ BUDGET CONSTRAINT

PROBLEM $(X = ?, Y = ?)$ → MAXIMIZE HIS UTILITY.



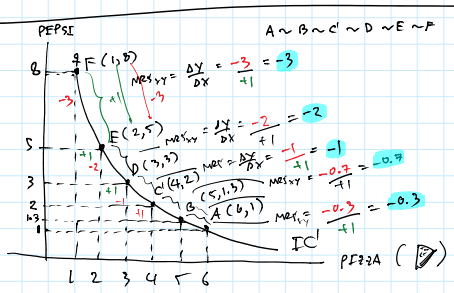
FACT #1 CHOICE $C(X^*, Y^*)$ IS A UTILITY-MAXIMIZING CHOICE.

FACT #2 AT CHOICE C: SLOPE OF IC = SLOPE OF BL

SLOPE OF IC ?

MARGINAL RATE OF SUBSTITUTION $(MRS_{xy}) = \left.\frac{\Delta Y}{\Delta X}\right|_{U=\bar{U}}$

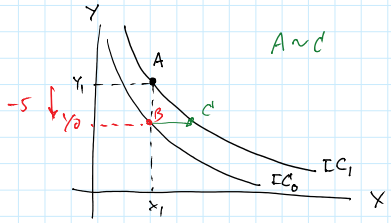
THE RATE AT WHICH A BUYER IS WILLING TO TRADE ONE GOOD FOR OTHER GOOD SO THAT HIS UTILITY REMAINS CONSTANT.



W/O THE SIGN, CONSIDER ONLY MAGNITUDE, YOU SEE THAT

MRS_{xy} IS DIMINISHING.

ANOTHER VERSION OF MRS



MARGINAL UTILITY (MU) = ADDITIONAL UTILITY A BUYER OBTAINS FROM AN ADDITIONAL UNIT OF GOOD

TOTAL UTILITY (TU) = TOTAL UTILITY FROM A BASKET OF GOOD

TO EXPLAIN THIS, LET'S ASSUME THAT UTILITY IS MEASURABLE.

UNIT: UTILS

(# BOTTLE) X	CUTILS TU	MU
0	0	+50
1	50	+30
2	80	

- MOVING FROM A → B: (10) (-5)
  LOSS IN UTILITY = $MU_Y \cdot \Delta Y$
- MOVING FROM B → C': (5) (+10)
  GAIN IN UTILITY = $MU_X \cdot \Delta X$
- FROM A → B → C':
  $MU_Y \cdot \Delta Y + MU_X \cdot \Delta X = 0 = \Delta TU$

- FROM A → B → C :

$MU_Y \cdot \Delta Y + MU_X \cdot \Delta X = 0 = \Delta TU$

$MU_Y \cdot \Delta Y = - MU_X \cdot \Delta X$

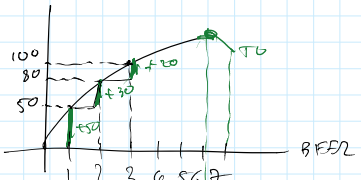
$$\frac{\Delta Y}{\Delta X} = -\frac{MU_X}{MU_Y}$$

SINCE $\frac{\Delta Y}{\Delta X}$ = SLOPE OF IC = MRS'_{XY},

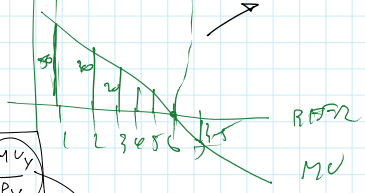
THEN $$MRS'_{XY} = -\frac{MU_X}{MU_Y}$$ ***

X	TU	
0	0	+50
1	50	+30
2	80	+20
3	100	+10
4	110	+5
5	115	0
6	115	-5
7	110	

MU BY DIMINISHING



"LAW OF DIMINISHING MU"



FACT #3 AT BASKET C :

$$MRS'_{XY} = -\frac{P_X}{P_Y}$$ OR $$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}$$

MRS'_{XY} CAN BE VIEWED AS MARGINAL BENEFIT OF GOOD X (MB_X)

$-\frac{P_X}{P_Y}$ CAN BE VIEWED AS MARGINAL COST OF GOOD X (MC_X)

$\frac{MU_X}{P_X}$ MARGINAL UTILITY PER BAHT SPENT ON GOOD X

$\frac{MU_Y}{P_Y}$ MARGINAL UTILITY PER BAHT SPENT ON GOOD Y

EXAMPLE: SUPPOSE $MU_X = 10$, $P_X = 2$; $MU_Y = 8$, $P_Y = 1$

$\frac{MU_X}{P_X} = \frac{10}{2} = 5 < \frac{MU_Y}{P_Y} = \frac{8}{1} = 8$

HERE, PER BAHT SPENT ON GOOD Y DELIVERS "HIGHER MU" THAN PER BAHT SPENT ON GOOD X.

EXAMPLE $P_X = 100$, $P_Y = 50$

$-\frac{P_X}{P_Y} = -\frac{100}{50} = -2$ ⇒ " OPP. COST OF HAVING AN EXTRA UNIT OF GOOD X MEASURED IN TERM OF FORGONE UNITS OF GOOD Y

AS LONG AS $MB_X > MC_X$, THIS GUY WILL BUY MORE X (PIZZA) AND LESS Y (PEPSI)

(MOVING FROM A → B → C)

ONCE $MB_X = MC_X$, HE STOPS. NOW HE ARRIVES AT THE OPTIMAL BASKET C WHERE $MB_X = MC_X$ OR $|MRS'_{XY}| = \left|-\frac{P_X}{P_Y}\right|$!!!

EXAMPLE

	QUESTION 1	Vs QUESTION 2
SCORE:	10 POINTS	20 POINTS
TIME SPENT TO GET FULL POINTS:	5 MINUTES	8 MINUTES

$\frac{10}{5} = 2 < \frac{20}{8} = 2.5$