Chapter 7: Utility Maximization

April, 4

Chapter 9: Consumer behavior → بالملخص

⊛ Utility: satisfaction → الاشباع الي بيجي للمستهلك من استهلاك سلعة او خدمة.

Usefulness ← الفائدة/المنفعة → بتختلف عن الاشباع

Utility → شعور/صعب نقيسه / يختلف من شخص لآخر لان الاذواق بين الناس مختلفة (subjective).

⊛ Total Utility (TU) & Marginal Utility (MU):

TU ⇓

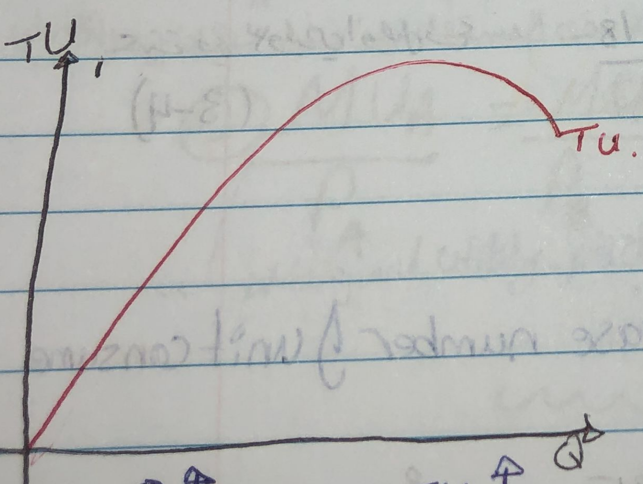
المنفعة الكلية (الاشباع الكلي) مجموع الاشباع الي حصلت عليه خلال استهلاك مجموعة من السلع والخدمات خلال فترة معينة.

MU ⇓

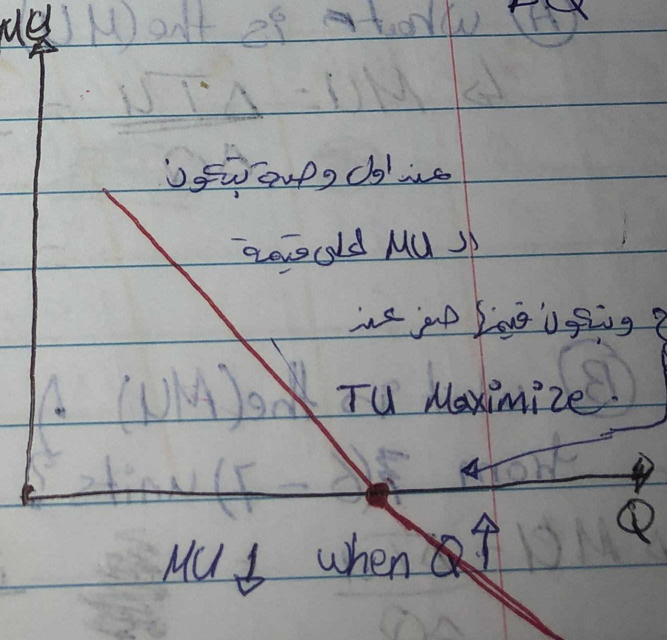
Extra Units

هو الاشباع الاضافي الناتج عن استهلاك وحدة اضافية

$$MU = \frac{\Delta TU}{\Delta Q}$$



$Q\uparrow \rightarrow TU\uparrow$



* اول وحدة يتم استهلاكها تعطي اكبر كمية من الاشباع.

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(*) Law of Diminishing marginal Utility.

كل ما يستهلك وحدة اضافية زيادة رح تقل المنفعة او الاشباع

قانون تناقص المنفعة (الاشباع)

$Q \uparrow \longrightarrow MU \downarrow$ (الاشباع)

Example

number of unit consume	TU	MU
1	5	5
2	11	6
3	18	7
4	24	6
5	30	6
6	35	5
7	32	-3

(A) what is the (MU) of the 4^{th} units ?

$$\to MU = \frac{\Delta TU}{\Delta Q} = \frac{24-18}{4-3} = 6$$

عشان بين 3 وبين [illegible] الرابع .
(3-4)

(B) what is the (MU) of increase number of unit consume from ~~7~~ (6 – 7) units ?

$$\to MU = \frac{\Delta TU}{\Delta Q} = \frac{32-35}{7-6} = -3$$

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(c) At what consumption level of this product does diminishing (MU) set in?

$Q\uparrow \rightarrow MU\downarrow$ ← بس يحل ما بلش ينقص

↳ بالجدول

↳ When the consumer consume the fourth (4th) unit.

* Utility Maximization Rule :-

* الشروط عشان أوصل للـ Maximum

(1) لازم أصرف كل دخلي ← انفاق كامل الدخل

QA   QB

P_A P_B

↳ $P_A A + P_B B = I$

↳ كم بنفق المستهلك من دخله عشان يوصل لـ utility

$$\text{(2)}\quad \frac{MU_A}{P_A} = \frac{MU_B}{P_B}$$

↳ Marginal utility per dollar.

Example Ahmed choosing between two goods, x & y, your Marginal Utility shown in the table bellow. If your income is $24, Price of good x is $4, Price of good y is $2

Unit	MUx	MUy	MUx/Px	MUy/Py
1	32	22	32/4 = 8	22/2 = 11
2	28	20	28/4 = 7	20/2 = 10
3	24	18	24/4 = 6	9
4	20	16	5	8
5	16	14	4	7
6	12	12	3	6
7	8	10	2	5

Grap	MU/$	Quantity	Cost = $P_x X + P_y Y$
A	8	x=1, y=4	(4*1)+(2*4)=12
B	7	x=2, y=5	(4*2)+(2*5)=18
C	6	x=3, y=6	(4*3)+(2*6)=24 → تم انفاق كل الدخل عليه
D	5	x=4, y=7	(4*4)+(2*7)=30

∴ X=3, y=6.

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② What is Total utility will Ahmed realize?

↳ TU = (32 + 28 + 24) + (22 + 20 + 18 + 14 + 12) = 186

~~Marginal~~

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① $\frac{MU_A}{P_A} = \frac{MU_B}{P_B}$

② $P_A A + P_B B = I$

⇒ If $\frac{MU_A}{P_A} > \frac{MU_B}{P_B}$

↳ The Consumer can Increase Total utility by purchasing more of A & less of B.

⇒ $\frac{MU_A}{P_A} < \frac{MU_B}{P_B}$

↳ The Consumer can Increase Total Utility by purchasing more of B & less of A

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Ex 4

(A) How achange in consumer income & good prices affect the consumer equilibrium.

→ The following taple represent the Utility derived from consuming two goods : X & Y (If $P_x = \$1$ $P_y = \$2$, Income $= \$12$

unit (Q) Consum	Marginal utility(x)	Marginal utility(y)	$\frac{MU_x}{P_x}$	$\frac{MU_y}{P_y}$
1	14	30	$\frac{14}{1} = 14$	$\frac{30}{2} = 15$
2	12	20	$\frac{12}{1} = 12$	$\frac{20}{2} = 10$
3	10	18	10	$\frac{18}{2} = 9$
4	8	16	8	8
5	7	14	7	7
6	6	13	6	6.5
7	5	12	5	6
8	4	11	4	5.5

Cost = سعر السلعة الاول × كمية + سعر السلعة الثانية × كمية

(A) Fill in the blanks in above table.

(B) Find all compination that satisfy the utility Maximization condition & Calculate the costs of each compination:-

Compination Group	MU/$	Q	Cost $= P_x X + P_y Y$ $= X + 2Y$
A	10	$X = 3$ $Y = 2$	$3 + 2(2) = 3 + 4 = 7$
B	8	$X = 4$ $Y = 4$	$4 + 2(4) = 12$
C	7	$X = 5$ $Y = 5$	$5 + 2(5) = 15$
D	6	$X = 6$ $Y = 7$	$6 + 2(7) = 20$

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Ⓒ which compination in the utility Maximization?

Group B → المجموعة اللي x ، y بتساووا فيها وبنفق عليها كل دخلي.

$x^* = 4$ & $y^* = 4$

Ⓓ Asume that Consumer Income Increase to (20$).
what quantities of each good should the Consumer purchase to maximize utility?

Group D → هي اللي بنفق عليها دخلي الجديد.

$x^* = 6$ & $y^* = 7$

⇝ Normal Good.

Ⓔ suppose that $I = \$12$ & price of x Increase frome \$1 to \$2. What quantity of each good should the Consumer purchase to Max utility?

تكملة الجدول.

MU_X / P_X
14/2 = 7
6
5
4.
3.5
3.
2.5
2

Cost = $2x + 2y$

Combination	MU/$	quantity	Cost =
A	7	x = 1, y = 5	2(1) + 2(5) = 12
B	6	x = 2, y = 7	2(2) + 2(7) =

→ Group (A)

$x^* = 1$ $y^* = 5$

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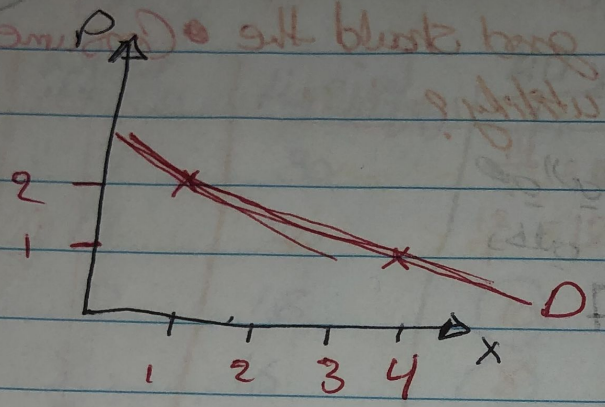
(F) Draw the demand curve for good X.

P	X
1	4
2	1

⇒ من E & C ومعطيات السؤال



$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$$

↳ If P_x ↑ → Marginal Utility per dollar ↓ (decrease).