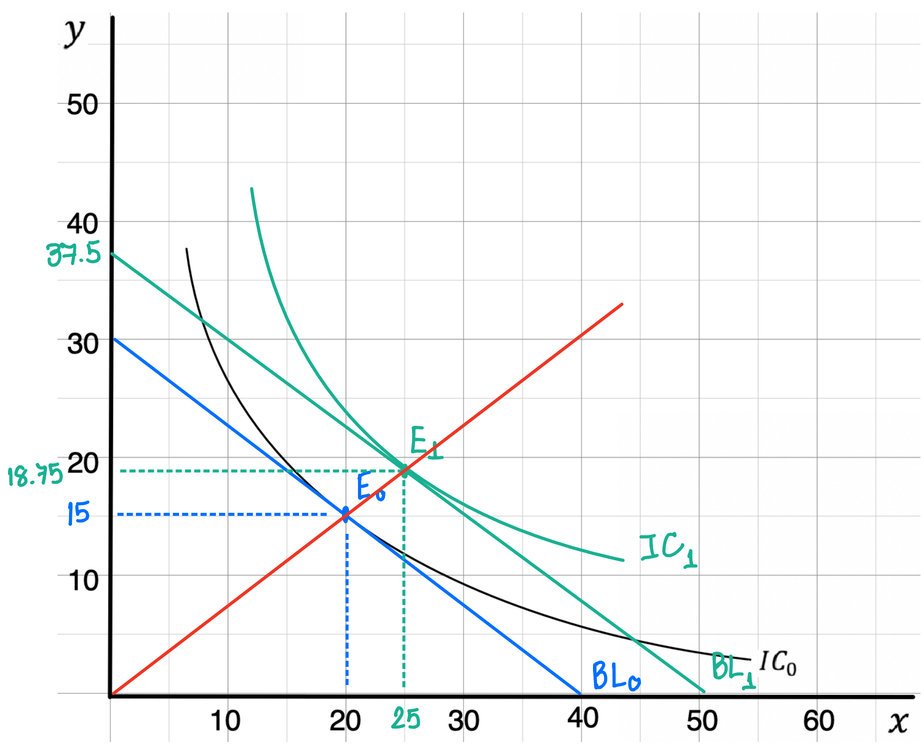
#1

12. Five consumers have the following marginal utility of apples and pears:

	Marginal Utility of Apples	Marginal Utility of Pears
Claire	6	12
Phil	6	6
Haley	6	3
Alex	3	6
Luke	3	12

The price of an apple is \$1, and the price of a pear is \$2. Which, if any, of these consumers are optimizing their choices of fruit? For those who are not, how should they change their spending?

#2 Given the price of x = 3, price of y = 4, and budget = 120.



Budget Line : $3x + 4y = 120$

- A) Draw the budget line and find the equilibrium with the given indifference curve IC in the diagram below.
- B) If the income increases from 120 to 150, where will be the new equilibrium so that the change in the consumption of x be such that the Income Elasticity of x is equal to 1.

C) With the change of equilibrium you found in (B), what will be the Income Elasticity of y?

- B) If the income increases from 120 to 150, where will be the new equilibrium so that the change in the consumption of x be such that the Income Elasticity of x is equal to 1.

From the information given, we know that $\% \Delta I = \frac{150-120}{120} = 0.25 = 25\%$

Income elasticity of x is equal to 1,

i.e. $\eta_{I_x} = 1$ only when $\frac{\% \Delta Q_x}{\% \Delta I} = 1 \Rightarrow \boxed{\% \Delta Q_x = \% \Delta I = 0.25}$

$$\% \Delta Q_x = \frac{Q_x^1 - Q_x^0}{Q_x^0} = 0.25$$

$$Q_x^1 = 0.25\, Q_x^0 + Q_x^0$$

$$Q_x^1 = 0.25(20) + 20 = 25$$

Therefore, when income rises from 120 to 150, the consumption of x must increase from 20 to 25 such that the income elasticity is exactly equal to 1. #

From the budget line, BL: $3x + 4y = 150$

$$3(25) + 4y = 150$$

$$y = 18.75$$

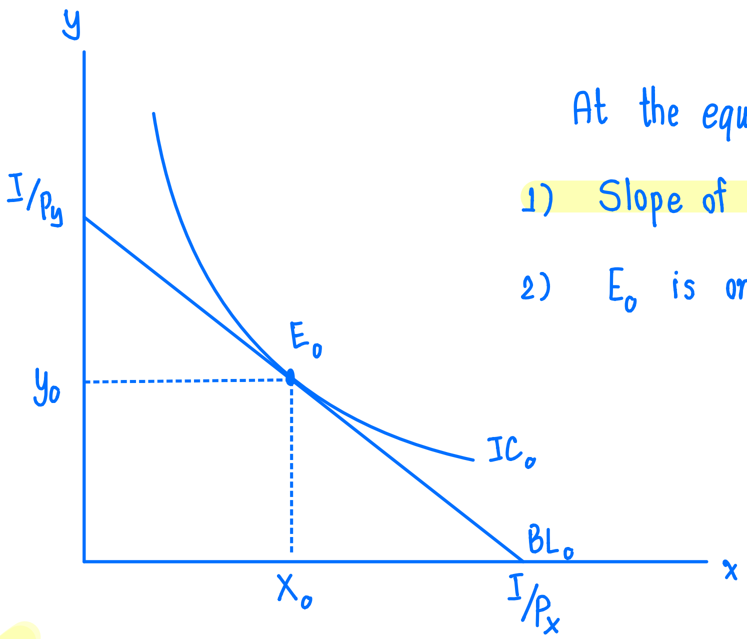
C) With the change of equilibrium you found in (B), what will be the Income Elasticity of y?

$$\eta_{I_y} = \frac{\% \Delta Q_y}{\% \Delta I} = \frac{\frac{18.75 - 15}{15}}{0.25} = \frac{0.25}{0.25} = 1 \quad \#$$

12. Five consumers have the following marginal utility of apples and pears:

	Marginal Utility of Apples (MU_x)	Marginal Utility of Pears (MU_y)	$\frac{MU_x}{MU_y}$
Claire	6	12	1/2
Phil	6	6	1
Haley	6	3	2
Alex	3	6	1/2
Luke	3	12	1/4

The price of an apple is \$1 (P_x), and the price of a pear is \$2 (P_y). Which, if any, of these consumers are optimizing their choices of fruit? For those who are not, how should they change their spending?



At the equilibrium point E_0, it is observable that

1) Slope of BL = Slope of IC (utility is maximized)

2) E_0 is on the budget line (the choice is feasible)

Slope of BL : $\frac{\Delta y}{\Delta x} = -\frac{I/P_y}{I/P_x} = -\frac{P_x}{P_y}$

Slope of IC : $MU_x \Delta x + MU_y \Delta y = 0$

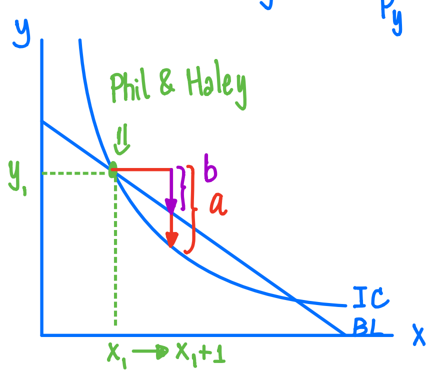
$$\frac{\Delta y}{\Delta x} = \frac{-MU_x}{MU_y}$$

So, slope of BL = slope of IC

$$\frac{1}{2} = \frac{P_x}{P_y} = \frac{MU_x}{MU_y}$$

Therefore, Claire and Alex are optimizing their choices, while others are not. To optimize their choices, each of them is suggested as follows.

• Phil and Haley ⇒ $\frac{P_x}{P_y} < \frac{MU_x}{MU_y}$. It means that they are willing to sacrifice a units of y, while the market requires them to dispose only b units of y ($a > b$) to obtain an additional unit of x. So, they should increase their consumptions of x (apple).



• Luke ⇒ $\frac{P_x}{P_y} > \frac{MU_x}{MU_y}$. It means that if he is forced to give up 1 unit of x, just only b units of y make him well-off. However, the market will give him a units of y ($a > b$). Therefore, he should consume less of x (apple) but more of y (pear). #