

substitution & income Effect when  $P_y$  change

$$S.E. = \begin{cases} \Delta X = 25 - 31 = -6 < 0 \\ \Delta Y = 19 - 15 = 4 > 0 \end{cases}$$

$$I.E. = \begin{cases} \Delta X = 20 - 25 = -5 < 0 \\ \Delta Y = 23 - 19 = 4 > 0 \end{cases}$$

$$T.E. = \begin{cases} \Delta X = 20 - 31 = -11 < 0 \\ \Delta Y = 23 - 15 = 8 > 0 \end{cases}$$

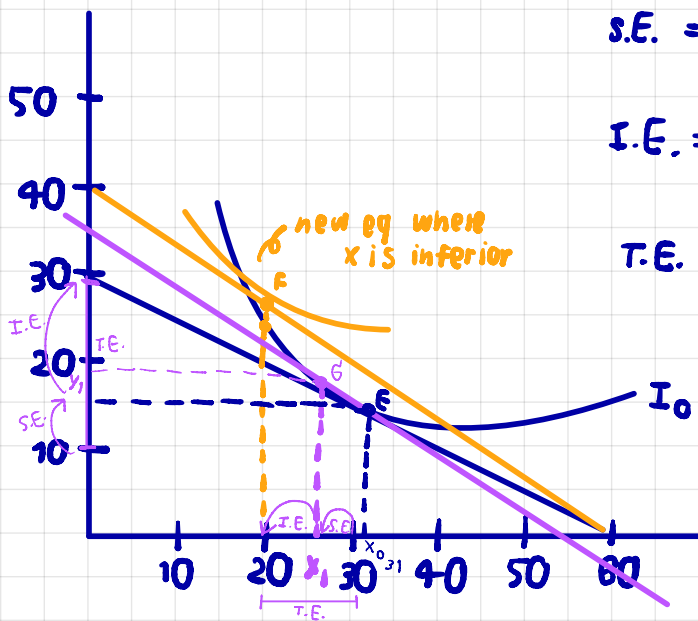
$$\begin{cases} P_x = 2 \\ P_y = 4 \end{cases} \begin{cases} 2x + 4y \\ = 120 \end{cases}$$

$$\begin{aligned} P_y \downarrow \text{ to } 3 \\ 2x + 3y &= 120 \\ \text{if } y=0, x &= 60 \\ x=0, y &= 40 \end{aligned}$$

show substitution Effect and Income Effect with  $x$  being inferior goods

$\therefore P_y$  decrease  $\Rightarrow$  consume less  $x$  and more  $y$   
 $x$  &  $y$  are substitute product

More real income  $\Rightarrow$  consume less  $x$  & more  $y$   
 $x$  is inferior  $y$  is luxury



$$S.E. = \begin{cases} \Delta X = 22 - 31 = -9 < 0 \\ \Delta Y = 21 - 15 = 6 > 0 \end{cases}$$

$$I.E. = \begin{cases} \Delta X = 10 - 22 = -12 < 0 \\ \Delta Y = 23 - 21 = 2 > 0 \end{cases}$$

$$T.E. = \begin{cases} \Delta X = 10 - 31 = -21 < 0 \\ \Delta Y = 23 - 15 = 8 > 0 \end{cases}$$

$$P_x = 2$$

$$P_y = 4$$

$$2x + 4y = 120$$

$$\text{if } y=0, x=60$$

$$x=0, y=30$$

show substitution Eff & income Eff with  $x$  being luxury good

$P_x \uparrow \Rightarrow$  consume less  $x$   
more  $y$

$x$  &  $y$  = substitute product

less real income  $\Rightarrow$  consume less  $x$   
more  $y$

$x$  is luxury  $y$  is inferior

