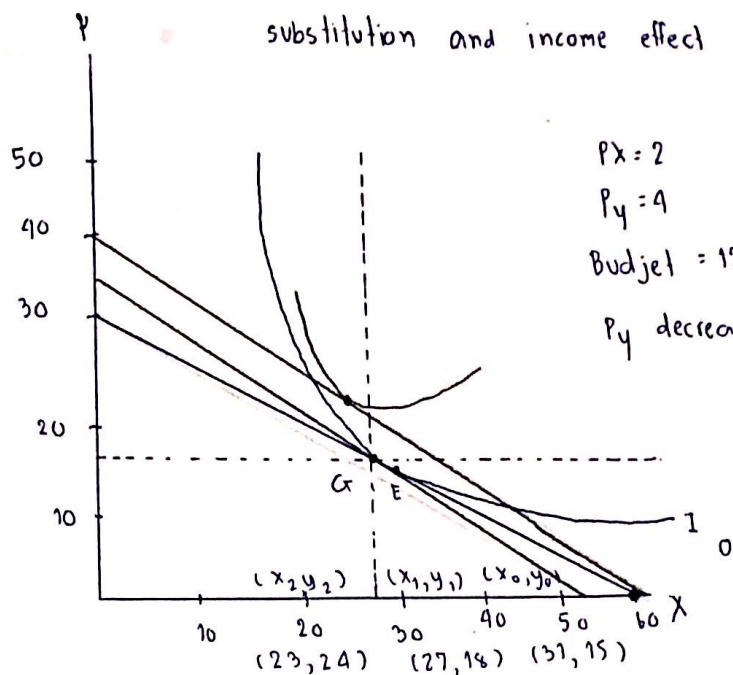


1.

substitution and income effect when  $P_y$  changes

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$P_x = 2$   
 $P_y = 4$   
 Budget = 120  
 $P_y$  decreases to 3

Show substitution effect and income effect with  $x$  being inferior goods

old

$$X P_x + Y P_y = B$$

$$2x + 4y = 120$$

$$4y = -2x + 120$$

new

$$X P_x + Y P_y = B$$

$$2x + 3y = 120$$

$$3y = -2x + 120$$

$$y = -\frac{2}{3}x + 40$$

$$y \text{ int } (x=0) = 40$$

$$x \text{ int } (y=0) = 60$$

Sol.

• Equilibrium change from E to F,  $P_y \downarrow \rightarrow$  consume less  $x$  and more  $y$

$\rightarrow x$  and  $y$  are substitute product

• relative price (slope) changes from  $-\frac{1}{2}$  to  $-\frac{2}{3}$

• so we draw imaginary budget line on same IC

$$S.E : \begin{cases} \Delta x = x_1 - x_0 = 27 - 31 = -4 < 0 \\ \Delta y = y_1 - y_0 = 18 - 15 = 3 > 0 \end{cases}$$

• more new imaginary budget line up, draw new IC

$$I.E : \begin{cases} \Delta x = x_2 - x_1 = 23 - 27 = -4 < 0 \\ \Delta y = y_2 - y_1 = 24 - 18 = 6 > 0 \end{cases}$$

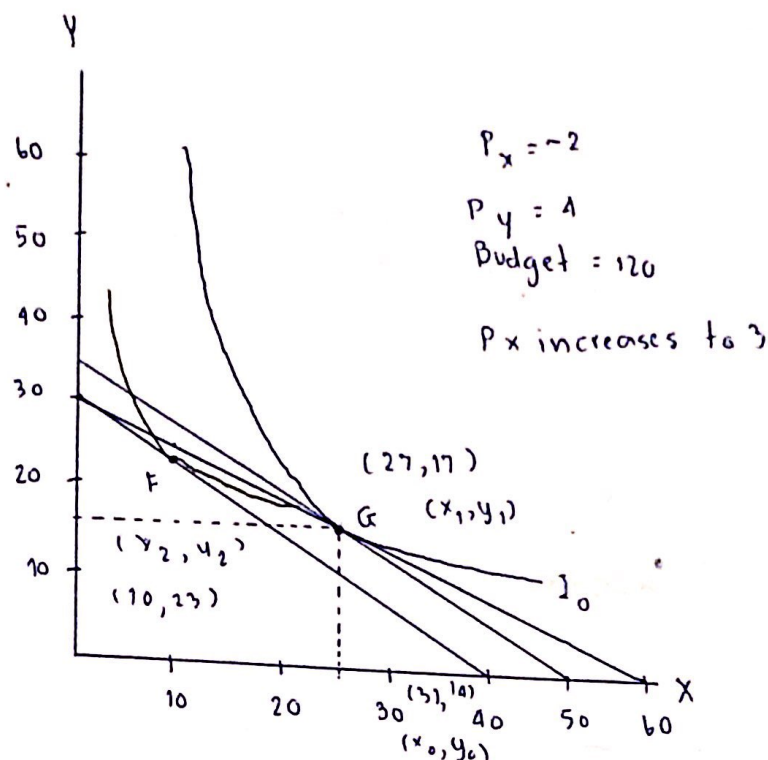
more real income  
 $\rightarrow$  consume less  $x$ , more  $y$   
 $\rightarrow x$  is inferior,  $y$  is luxury

• Total effect = S.E + I.E

$$T.E = \Delta x = x_2 - x_0 = 23 - 31 = -8$$

$$\Delta y = y_2 - y_0 = 24 - 15 = 9$$

(2.)

old

$$xP_x + yP_y = B$$

$$2x + 4y = 120$$

$$4y = -2x + 120$$

$$y = -\frac{1}{2}x + 30$$

new

$$xP_x + yP_y = B$$

$$3x + 4y = 120$$

$$4y = -3x + 120$$

$$y = -\frac{3x}{4} + 30$$

$$y_{int} = 30$$

$$x_{int} = 40$$

Sol.

- Equilibrium change from E to F,  $P_x$  increase  $\Rightarrow$  consume less  $x$  and more  $y$   
 $\rightarrow x$  and  $y$  are substitute product

- relative price (slope) changes from  $-\frac{1}{2}$  to  $-\frac{3}{4}$

- so we draw imaginary budget line on same IC

$$S.E. = \begin{cases} \Delta x = x_1 - x_0 = 27 - 31 = -4 < 0 \\ \Delta y = y_1 - y_0 = 17 - 14 = 3 > 0 \end{cases}$$

- move new imaginary budget line up, draw new IC

$$I.E. = \begin{cases} \Delta x = x_2 - x_1 = 10 - 27 = -17 < 0 \\ \Delta y = y_2 - y_1 = 23 - 17 = 6 > 0 \end{cases}$$

less real income  
 $\rightarrow$  consume less  $x$ , more  $y$   
 $\rightarrow x$  is luxury,  $y$  is inferior

- Total effect = S.E. + I.E.

$$T.E. = \Delta x = x_2 - x_0 = 10 - 31 = -21$$

$$\Delta y = y_2 - y_0 = 23 - 14 = 9$$