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Substitution and Income Effect when P_y changes

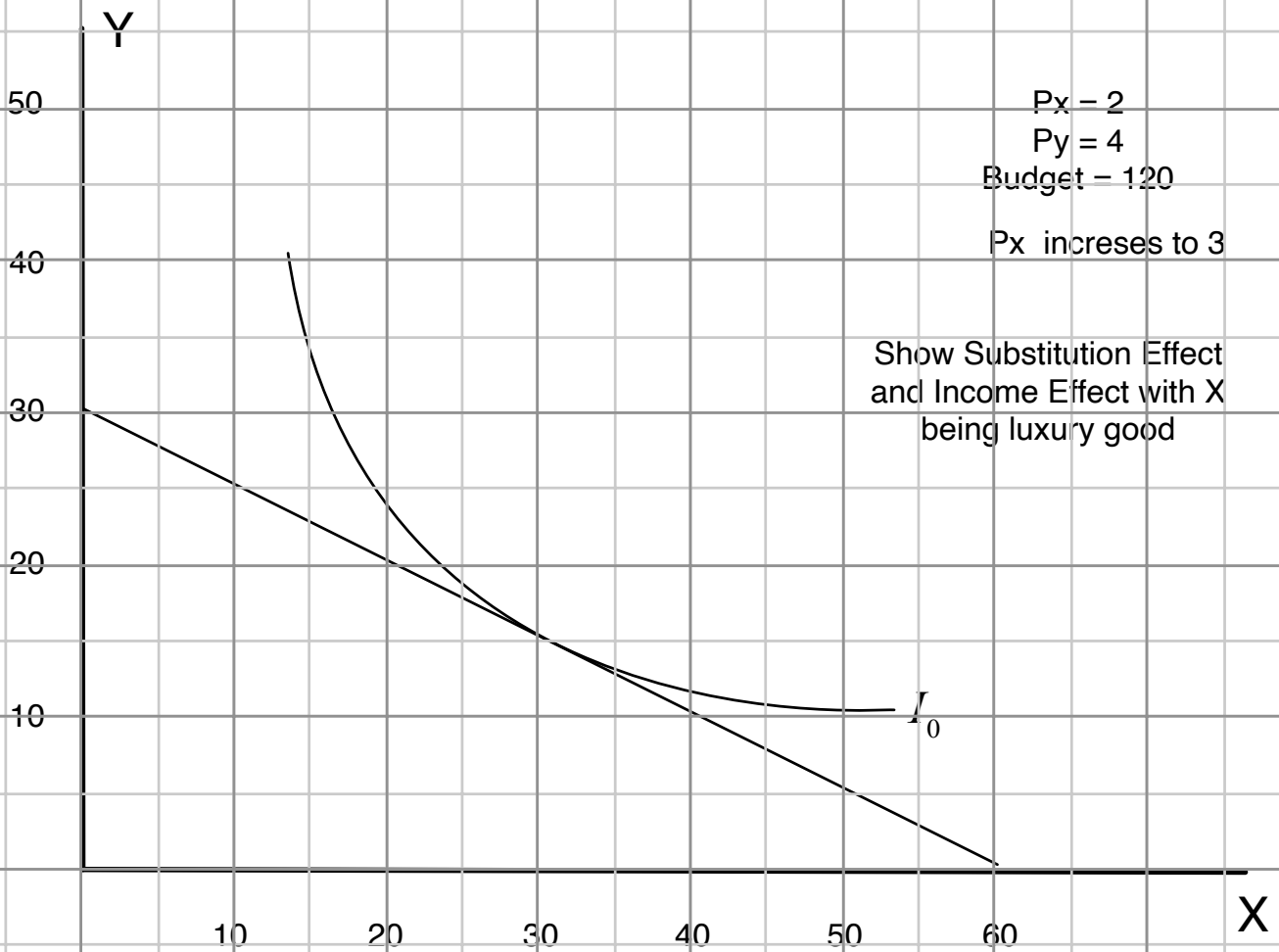
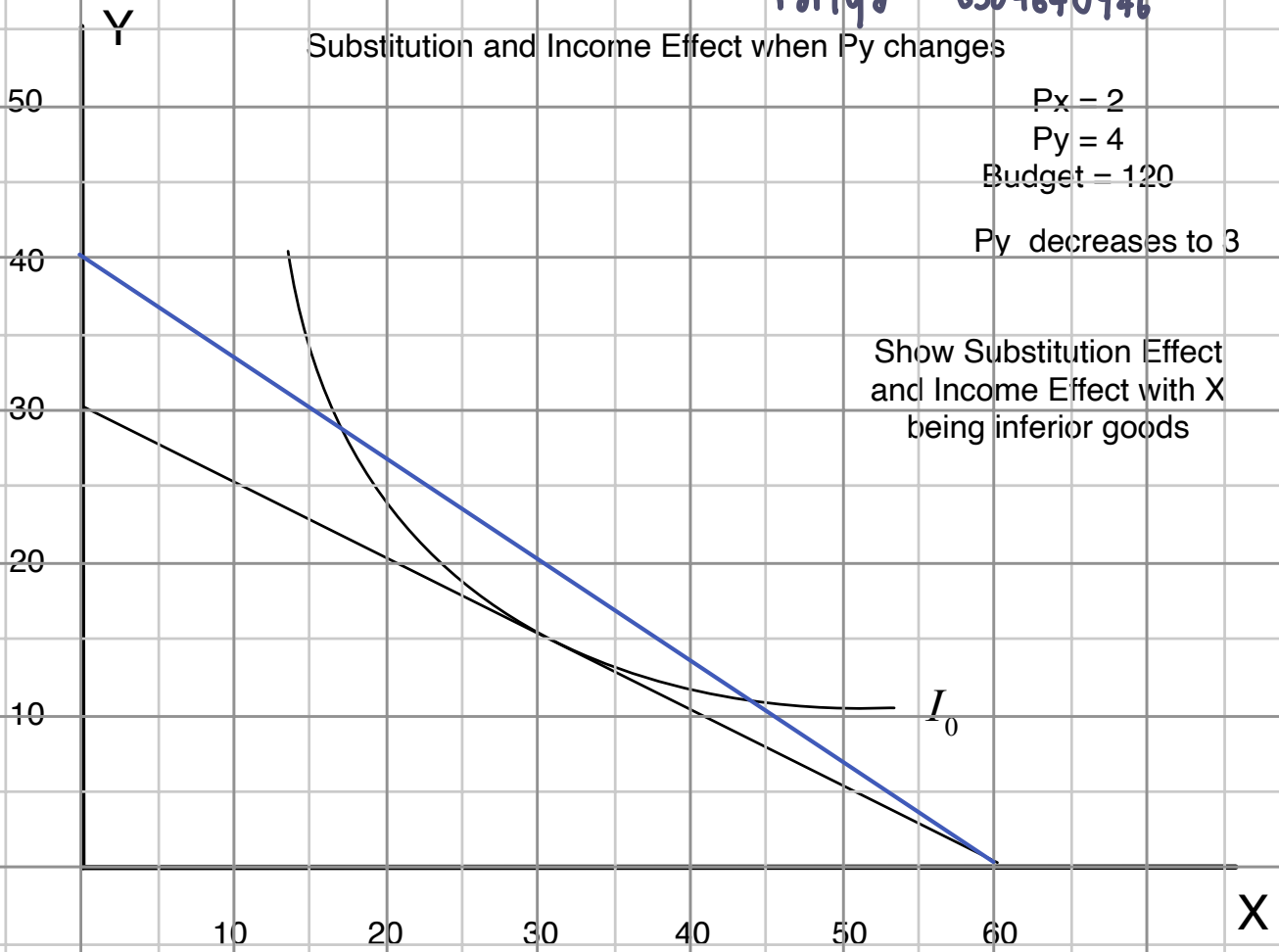
$$P_x = 2$$

$$P_y = 4$$

$$\text{Budget} = 120$$

P_y decreases to 3

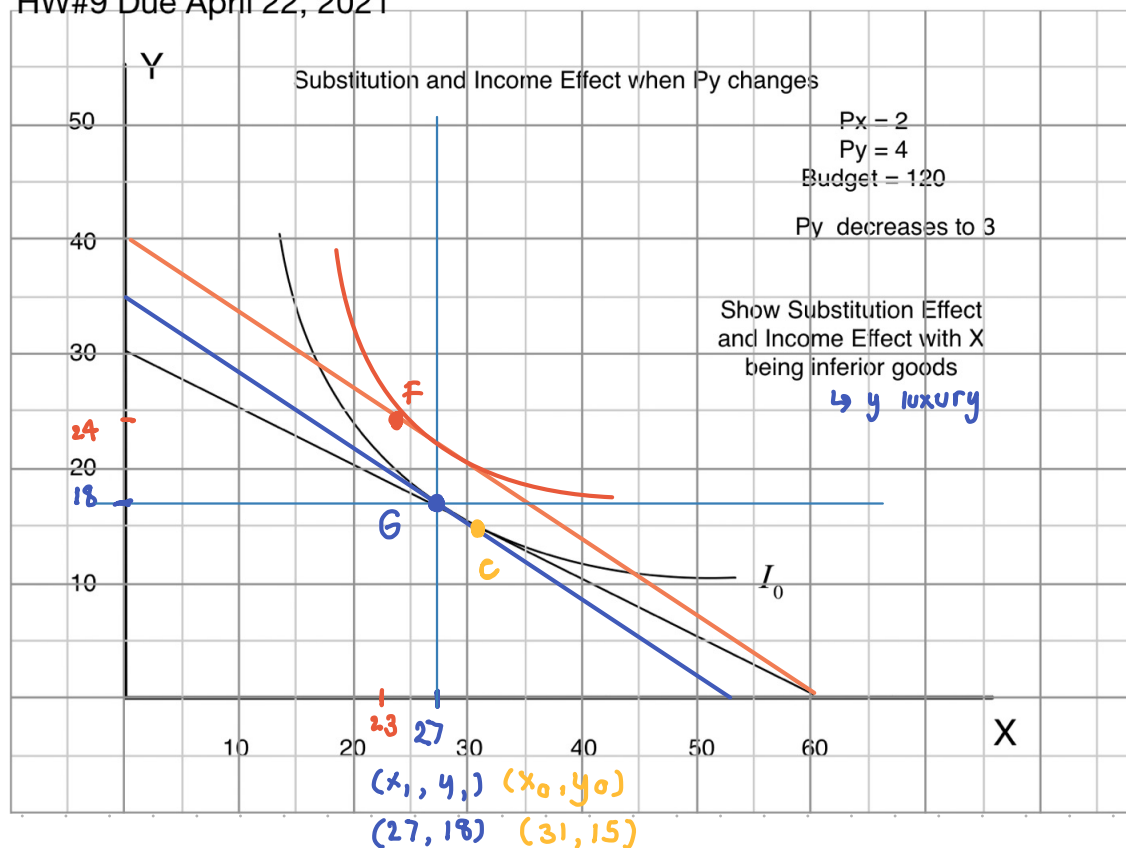
Show Substitution Effect
and Income Effect with X
being inferior goods



①

HW#9 Due April 22, 2021

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old

$$\begin{aligned} xP_x + 4P_y &= B \\ 2x + 4y &= 120 \\ 4y &= -2x + 120 \\ y &= -\frac{1}{2}x + 30 \end{aligned}$$

new

$$\begin{aligned} xP_x + 4P_y &= B \\ 2x + 3y &= 120 \\ 3y &= -2x + 120 \\ y &= -\frac{2}{3}x + 40 \end{aligned}$$

y intercept (0, 40)
 x intercept (60, 0)

Step: $\rightarrow$ Eq change from E to F, P_y decrease
 (consume less of x more of y) $\rightarrow$ x and y = substitute

$\rightarrow$ Slope or relative price changes from $-\frac{1}{2}$ to $-\frac{2}{3}$

$\rightarrow$ imaginary line on same IC

S.E. = $\Delta x = x_1 - x_0 = 27 - 31 = -4 < 0$
 $\Delta y = y_1 - y_0 = 18 - 15 = 3 > 0$

$\rightarrow$ move new imaginary budget line up $\rightarrow$ new IC

I.E. = $\Delta x = x_2 - x_1 = 23 - 27 = -4 < 0$
 $\Delta y = y_2 - y_1 = 24 - 18 = 6 > 0$

more real income
 less x more y
 $\rightarrow$ inferior $\rightarrow$ luxury

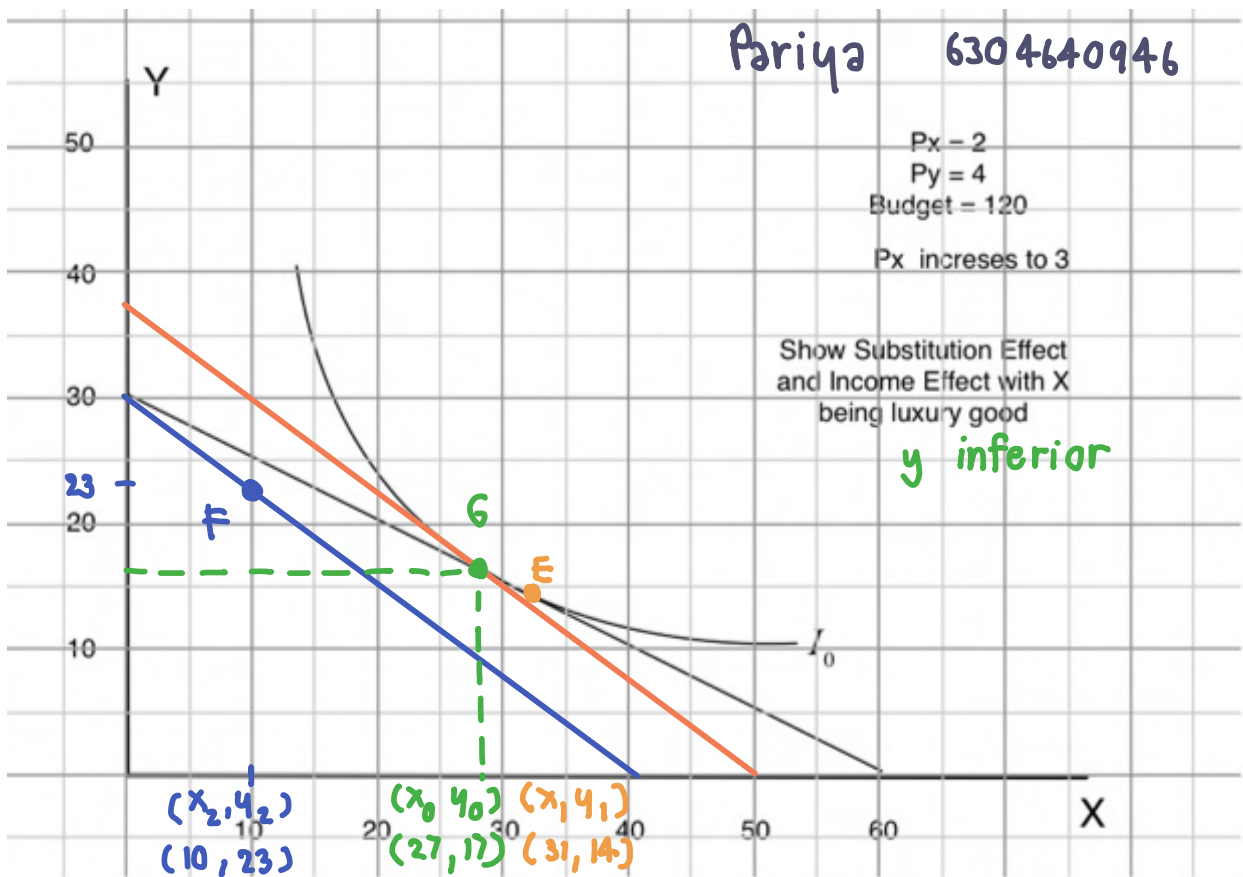
$\rightarrow$ Total Effect = S.E. + I.E.

T.E. = $\Delta x = x_2 - x_0 = 23 - 31 = -8$
 $\Delta y = y_2 - y_0 = 24 - 15 = 9$

②

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Old

$$xP_x + yP_y = B$$

$$2x + 4y = 120$$

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

y intercept (0,30)

x intercept (40,0)

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

New

$$xP_x + yP_y = B$$

$$3x + 4y = 120$$

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

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

Step : $\rightarrow$ Eq change from E to F, P_x increase (consume less x and more y) $\rightarrow$ x and y are substitute

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

$\rightarrow$ Imaginary budget line on same IC

$$S.E. = \Delta x = x_1 - x_0 = 27 - 31 = -4 < 0$$

$$\Delta y = y_1 - y_0 = 17 - 14 = 3 > 0$$

$\rightarrow$ move new imaginary line up $\rightarrow$ New IC

$$I.E. = \Delta x = x_2 - x_1 = 10 - 27 = -17 < 0$$

$$\Delta y = y_2 - y_1 = 23 - 17 = 6 > 0$$

less real income

less x more y

$\rightarrow$ luxury $\rightarrow$ inferior

$\rightarrow$ Total Effect = S.E. + I.E.

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

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