HW#9 Due April 22, 2021

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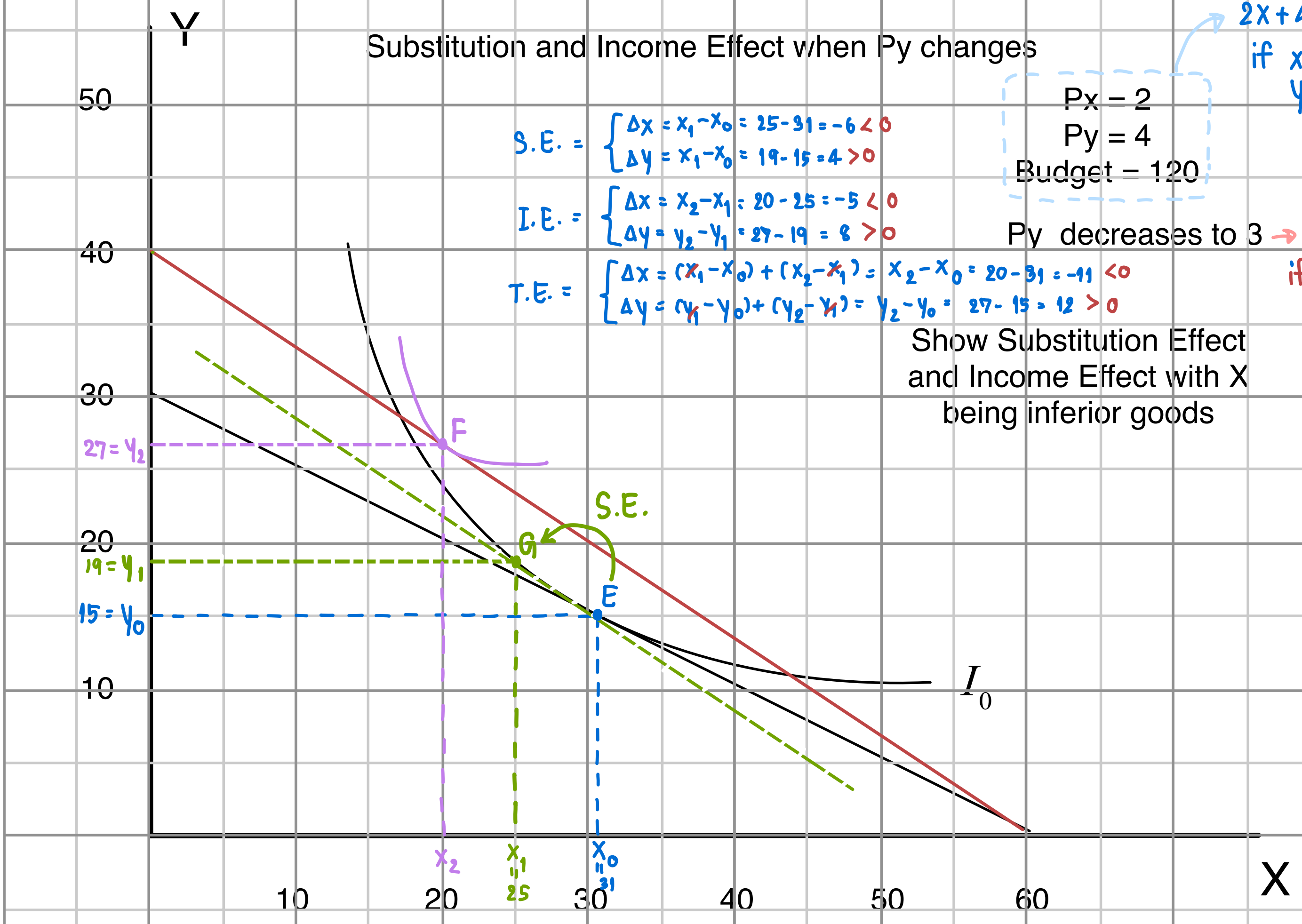
Substitution and Income Effect when Py changes



Px = 2
Py = 4
Budget = 120

$2x + 4y = 120$
if $x = 0;\ y = 30$
$y = 0;\ x = 60$

Py decreases to 3 → $2x + 3y = 120$
if $x = 0;\ y = 40$
$y = 0;\ x = 60$

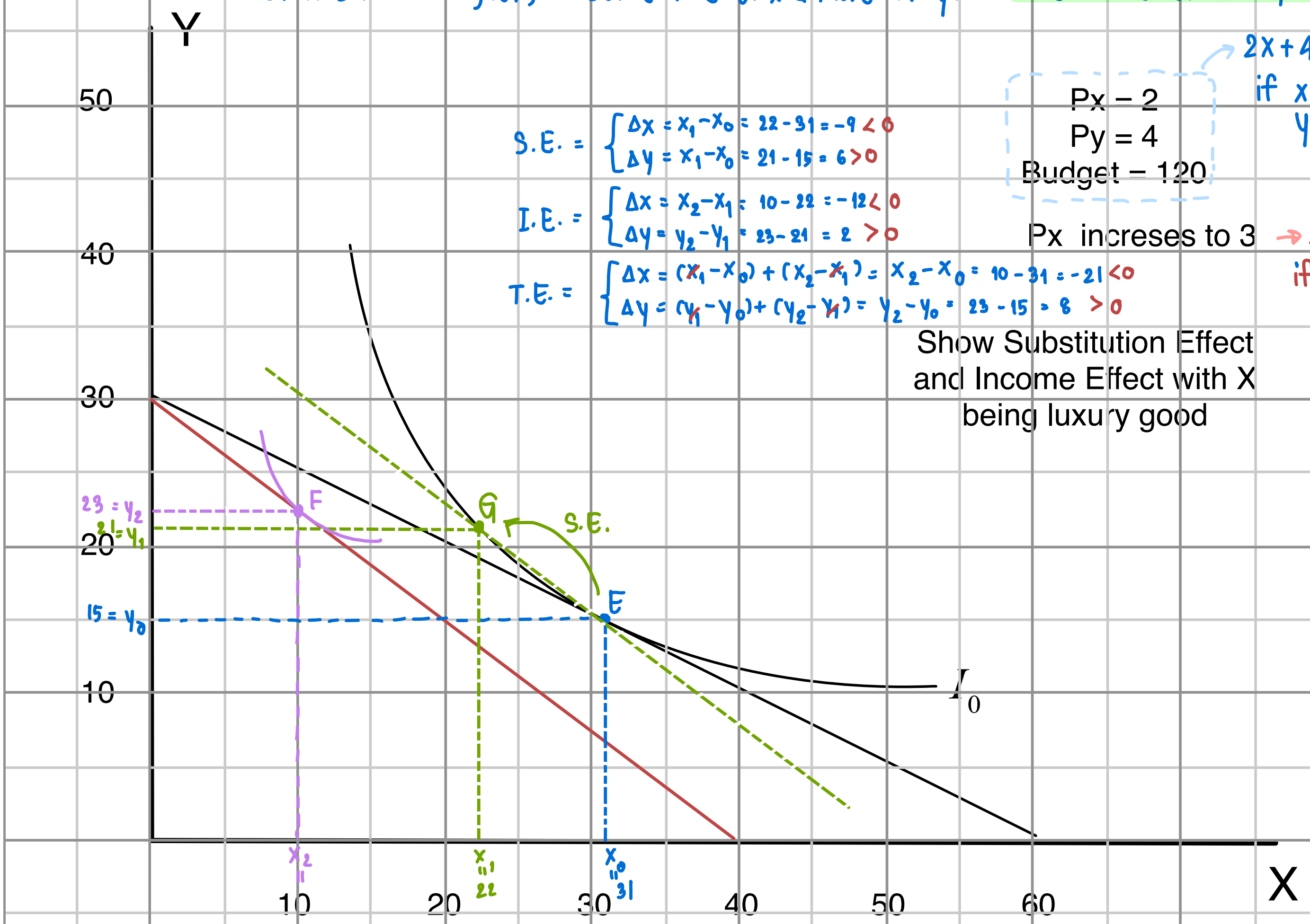
Show Substitution Effect and Income Effect with X being inferior goods

$$\text{S.E.} = \begin{cases} \Delta x = x_1 - x_0 = 25 - 31 = -6 < 0 \\ \Delta y = x_1 - x_0 = 19 - 15 = 4 > 0 \end{cases}$$

$$\text{I.E.} = \begin{cases} \Delta x = x_2 - x_1 = 20 - 25 = -5 < 0 \\ \Delta y = y_2 - y_1 = 27 - 19 = 8 > 0 \end{cases}$$

$$\text{T.E.} = \begin{cases} \Delta x = (\cancel{x_1} - x_0) + (x_2 - \cancel{x_1}) = x_2 - x_0 = 20 - 31 = -11 < 0 \\ \Delta y = (\cancel{y_1} - y_0) + (y_2 - \cancel{y_1}) = y_2 - y_0 = 27 - 15 = 12 > 0 \end{cases}$$

∴ When P_y decreases, consume less of x and more of y. So x & y are substitute.
When real income is higher, consume less of x & more of y. So x is inferior and y is luxury.



Px = 2
Py = 4
Budget = 120

$2x + 4y = 120$
if $x = 0;\ y = 30$
$y = 0;\ x = 60$

Px increses to 3 → $3x + 4y = 120$
if $x = 0;\ y = 30$
$y = 0;\ x = 40$

Show Substitution Effect and Income Effect with X being luxury good

$$\text{S.E.} = \begin{cases} \Delta x = x_1 - x_0 = 22 - 31 = -9 < 0 \\ \Delta y = x_1 - x_0 = 21 - 15 = 6 > 0 \end{cases}$$

$$\text{I.E.} = \begin{cases} \Delta x = x_2 - x_1 = 10 - 22 = -12 < 0 \\ \Delta y = y_2 - y_1 = 23 - 21 = 2 > 0 \end{cases}$$

$$\text{T.E.} = \begin{cases} \Delta x = (\cancel{x_1} - x_0) + (x_2 - \cancel{x_1}) = x_2 - x_0 = 10 - 31 = -21 < 0 \\ \Delta y = (\cancel{y_1} - y_0) + (y_2 - \cancel{y_1}) = y_2 - y_0 = 23 - 15 = 8 > 0 \end{cases}$$

∴ When P_x increases, consume less of x and more of y. So x & y are substitute.
When real income is lower, consume less of x & more of y. So x is luxury and y is inferior.