

HW#9 Due April 22, 2021

Substitution and Income Effect when P_y changes

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$690 + 64 / 290$

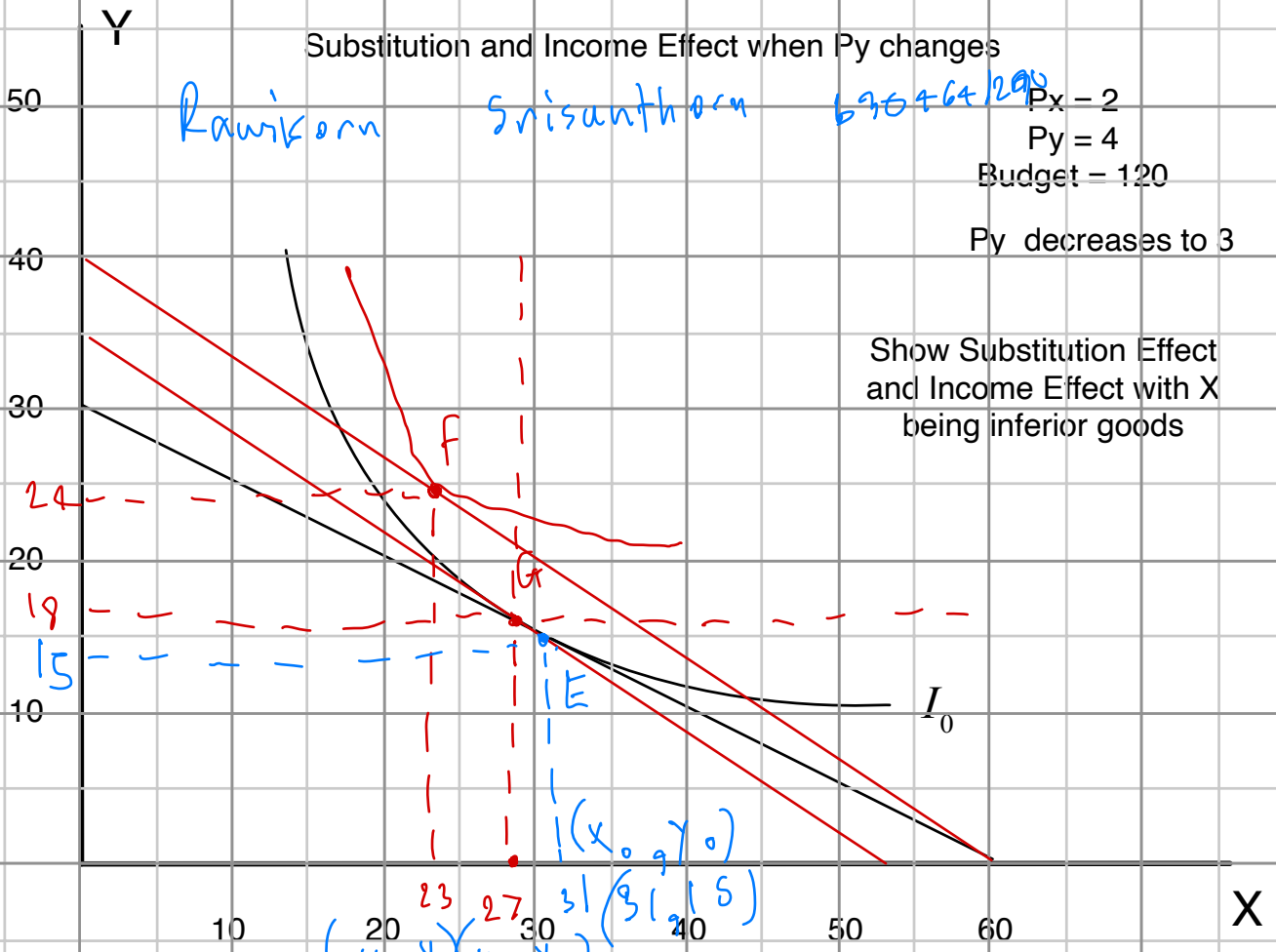
$P_x = 2$

$P_y = 4$

Budget = 120

P_y decreases to 3

Show Substitution Effect and Income Effect with X being inferior goods



(x_2, y_2) (23, 24)
 (x_1, y_1) (27, 19)
 (x_0, y_0) (31, 15)

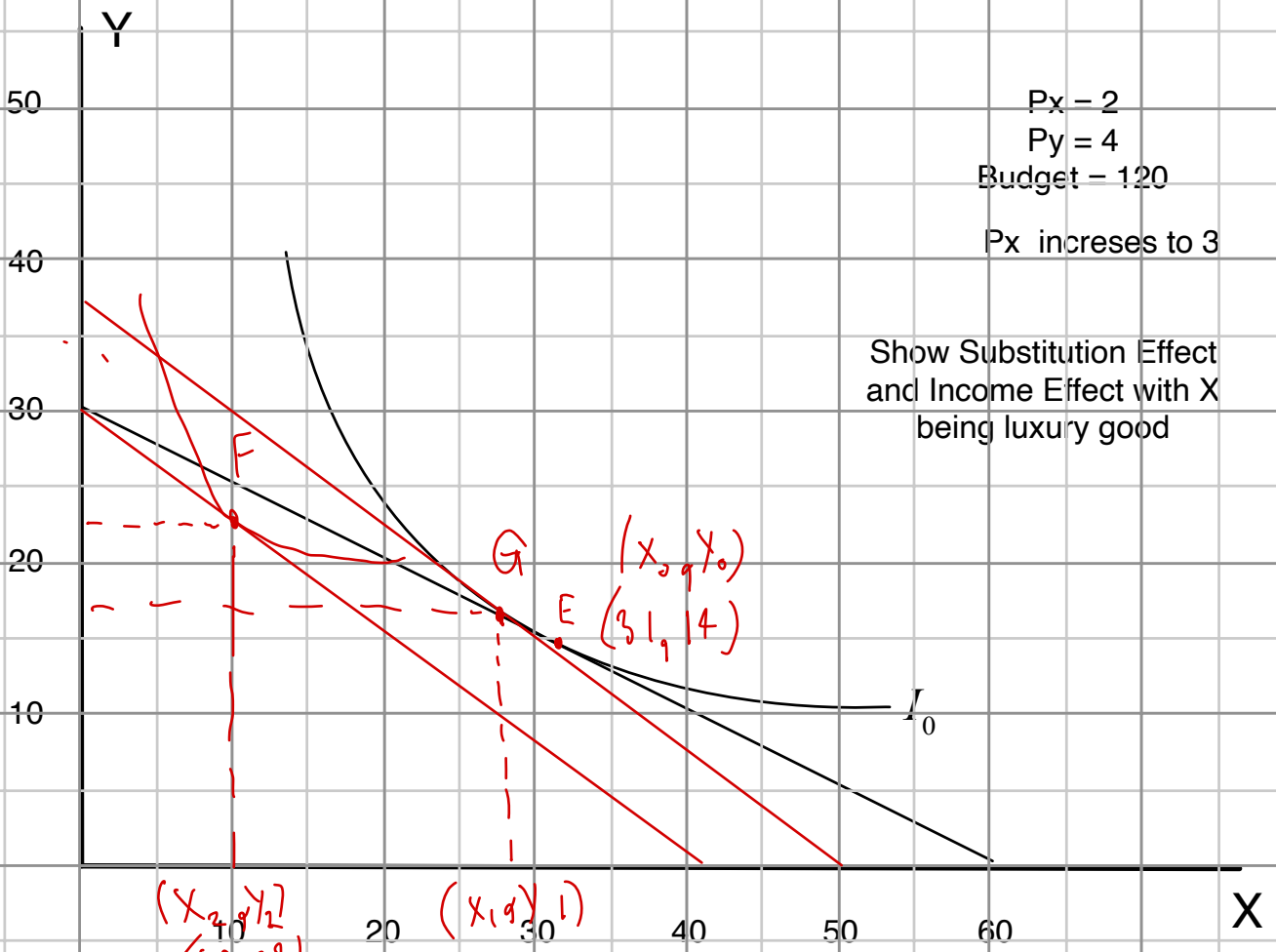
$P_x = 2$

$P_y = 4$

Budget = 120

P_x increases to 3

Show Substitution Effect and Income Effect with X being luxury good



(x_2, y_2) (10, 23)
 (x_1, y_1) (27, 17)
 (x_0, y_0) (31, 14)

1) old

$$X P_x + Y P_y = B$$

$$2x + 4y = 120$$

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

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

new

$$X P_x + Y P_y = B$$

$$2x + 3y = 120$$

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

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

y intercept = 40

x intercept = 60

1) Equilibrium change from E to F
 P_y decrease \rightarrow consume less x and
more y $\rightarrow x$ and y are substitute
product

slope change from $-\frac{1}{2} \rightarrow -\frac{2}{3}$

$$SE: \Delta X = X_1 - X_0 = 27 - 31 = -4 < 0$$

$$\Delta Y = Y_1 - Y_0 = 18 - 15 = 3 > 0$$

more new imaginary budget line
on same IC

$$TE: \Delta X = X_2 - X_1 = 23 - 27 = -4 < 0$$

$$\Delta Y = Y_2 - Y_1 = 24 - 18 = 6 > 0$$

$$TF: \Delta X = X_2 - X_0 = 23 - 31 = -8$$

$$\Delta Y = Y_2 - Y_0 = 24 - 15 = 9$$

2) old

$$x^p + 4y^p = B$$

$$2x + 4y = 120$$

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

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

new

$$3x + 4y = 120$$

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

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

y intercept = 30

x intercept = 40

Equilibrium change from E to F

P_x increase \Rightarrow consume less x and more y (substitute product)

- slope changes from $-\frac{1}{2} \rightarrow -\frac{3}{4}$

so we draw imaginary budget line on same IC

$$S.E. : \Delta X = X_1 - X_0 = 27 - 31 = -4 < 0$$

$$\Delta Y = Y_1 - Y_0 = 17 - 14 = 3 > 0$$

move new imaginary budget line

$$I.E. : \Delta X = X_2 - X_1 = 10 - 27 = -17 < 0$$

$$\Delta Y = Y_2 - Y_1 = 23 - 17 = 6 > 0$$

less real income consume less x but more y this mean x is luxury y is inferior

$$\uparrow E : \Delta X = X_2 - X_0 = 10 - 31 = -21$$

$$\Delta Y = Y_2 - Y_0 = 23 - 14 = 9$$