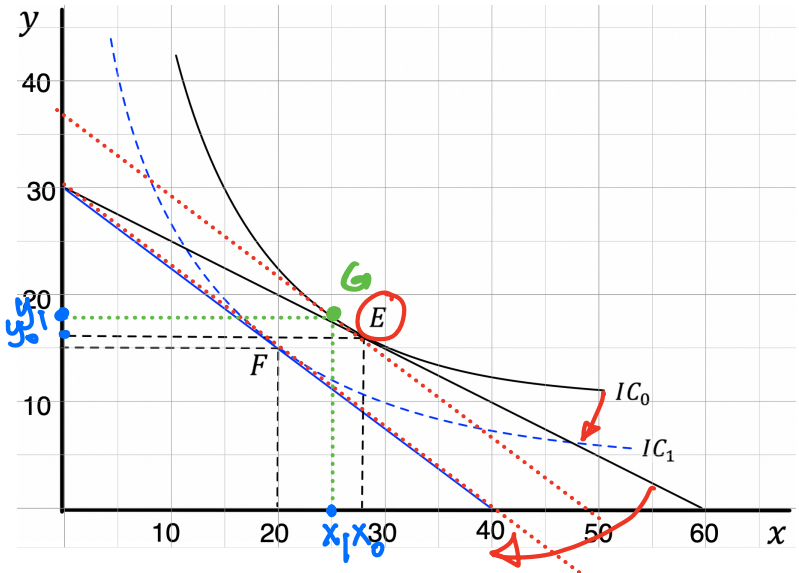
## Chapter 14.a Substitution and Income Effects

**2.** $p_x$ increases from $p_x = 2$ to $p_x' = 3$.




- The equilibrium point changes from $E = (x_0, y_0)$ to $F = (x_2, y_2)$. In this case, when $p_x$ increases, the consumer buys less of $y$. This means $x$ and $y$ are complementary.
- The relative price changes from $\frac{p_x}{p_y} = \frac{2}{4}$ to $\frac{p_x'}{p_y} = \frac{3}{4}$
- To keep the same satisfaction with the new relative price $\frac{p_x'}{p_y}$ draw an ***imaginary budget line*** with slope $\frac{p_x'}{p_y}$ to be tangent with the original Indifference Curve $IC_0$.
- The Substitution Effect is:

$$S.E. = \begin{cases} \Delta x = x_1 - x_0 = 25 - 28 = -3 < 0 \\ \Delta y = y_1 - y_0 = 18 - 16 = 2 > 0 \end{cases}$$

- When price changes in such a way that $x$ is relatively more expensive, the Substitution Effect is always such that $\Delta x < 0$ and $\Delta y > 0$.
- Income Effect can be found by moving the imaginary budget line to be tangent with the new budget line.

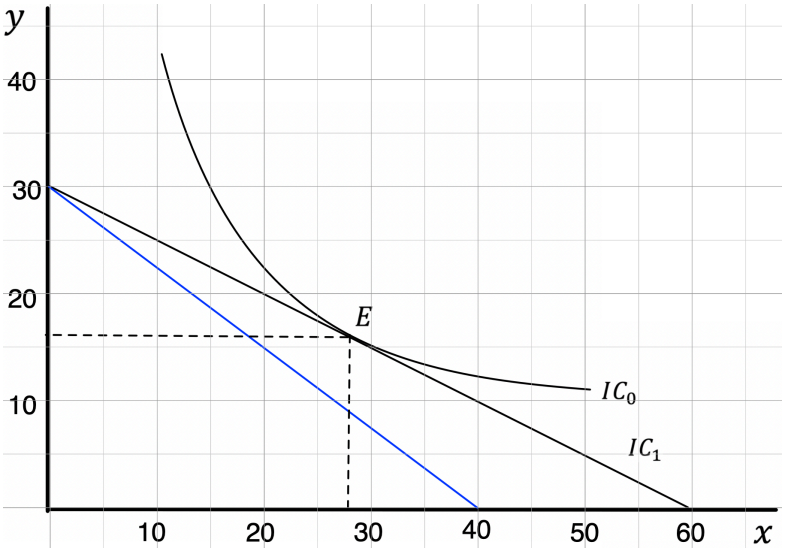
$$I.E. = \begin{cases} \Delta x = x_2 - x_1 = \\ \Delta y = y_2 - y_1 = \end{cases}$$

- According to the resulting $I.E.$, $x$ and $y$ are normal goods because as the real income decreases, the consumer consumes less of both $x$ and $y$.
- $Total\ Effect = T.E. = S.E. + I.E.$

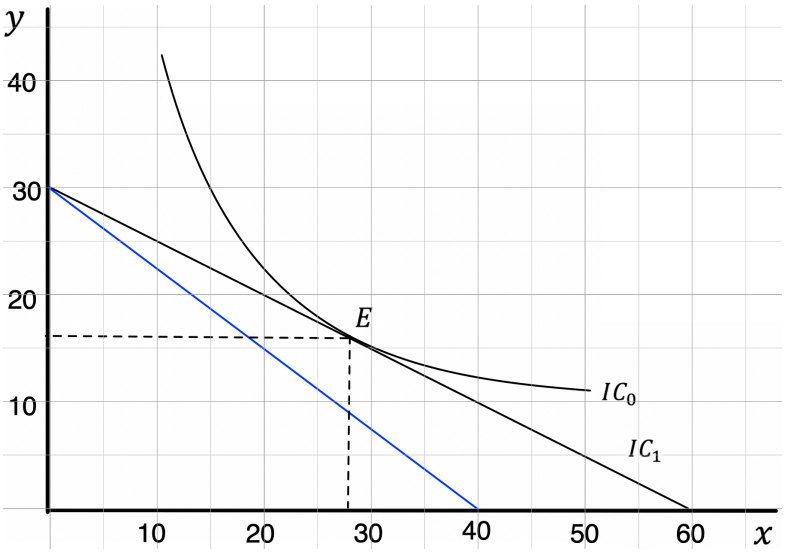
$$= \begin{cases} \Delta x = (x_1 - x_0) + (x_2 - x_1) = x_2 - x_0 \\ \Delta y = (y_1 - y_0) + (y_2 - y_1) = y_2 - y_0 \end{cases}$$

- In the following graphs, draw $IC_1$ in such a way that $x$ is luxury and inferior.

$x$ is luxury

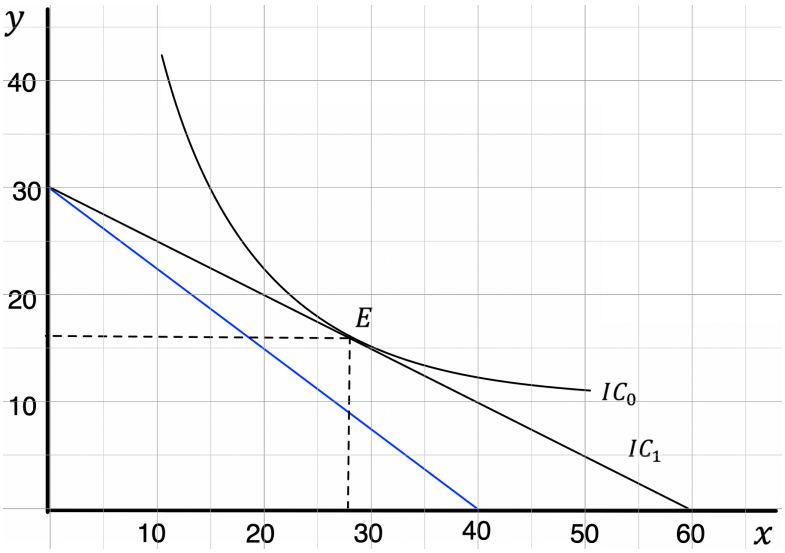



$x$ is inferior




- Can $x$ be so inferior such that when the price $p_x$ decreases, the consumer buys less of $x$?

## $x$ is Giffen good




- This means that when price $p_x$ increases, the consumer ends up buying more of $x$. Thus, this violates the Law of Demand even when the consumer is being rational.