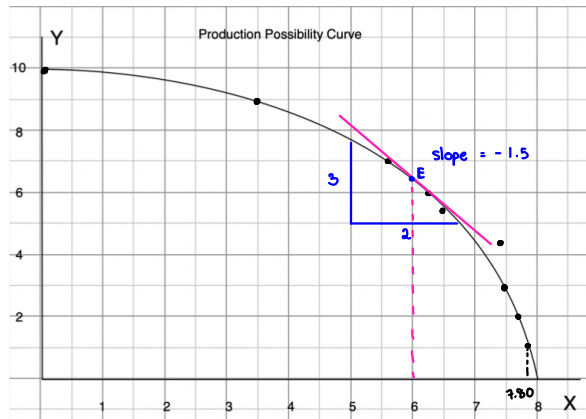


HW#4 Due Jan 27, 2022

HW Nonlinear PPC



- a) Find the opportunity cost of each additional unit of y in terms of units of x

y	x	Opp. Cost of y
0	8	0.1
1	7.9	0.15
2	7.7	0.1
3	7.45	0.15
4	7.1	0.35
5	6.7	0.4
6	6.25	0.45
7	5.55	0.7
8	4.75	0.8
9	3.5	1.25
10	0	3.5

- b) Is the opportunity cost of y increasing?
 c) Compute the opportunity cost per unit of y when $x = 6$.
 d) At $x = 6$, approximate how much more x can be produced if we have y less by 0.2 units.

b) The opportunity cost of y is increasing

c) The opportunity cost per unit of y when $x = 6$

At point E slope = -1.5

$$\Delta y = \text{slope} \cdot \Delta x$$

$$1 = -1.5 \cdot \Delta x$$

$$0.6 = \Delta x$$

$\therefore$ The opportunity cost per unit of y at $x = 6$ is 0.6

d) if y decreases by 0.2 unit, x will be produced more by 0.13 unit

$$\Delta y = \text{slope} \cdot \Delta x$$

$$0.2 = -1.5 \cdot \Delta x$$

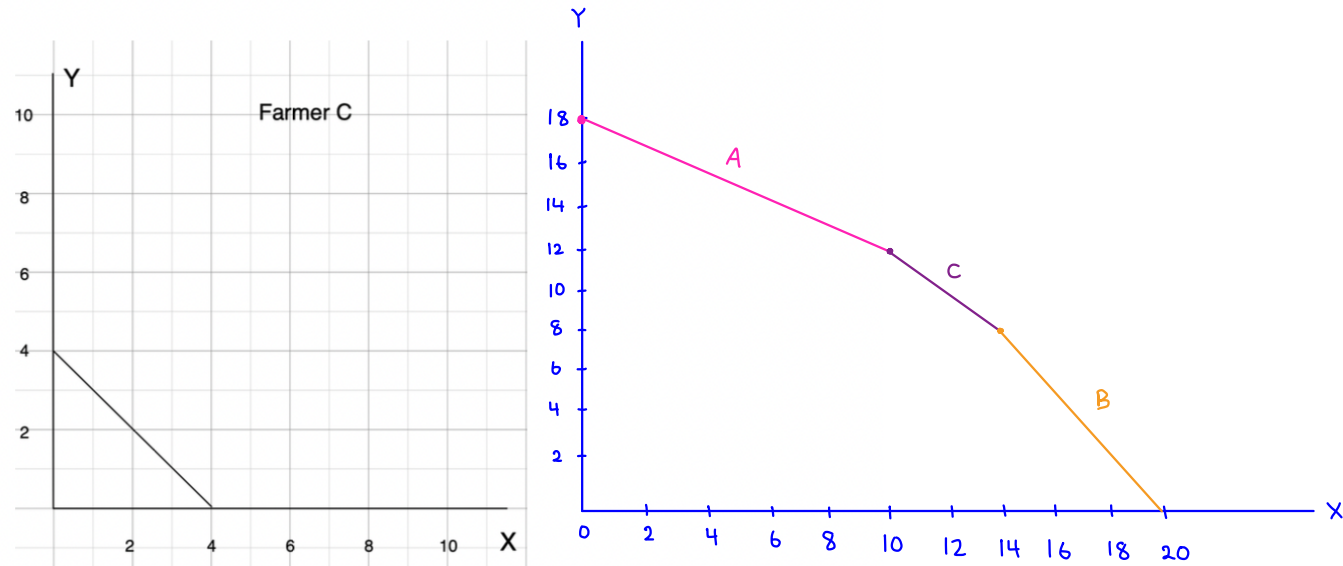
$$0.13 = \Delta x$$

A slope = $-\frac{6}{10} \rightarrow x \uparrow 1 \text{ unit}, y \downarrow 0.6 \text{ unit}$

B slope = $-\frac{8}{6} \rightarrow x \uparrow 1 \text{ unit}, y \downarrow 1.3 \text{ unit}$

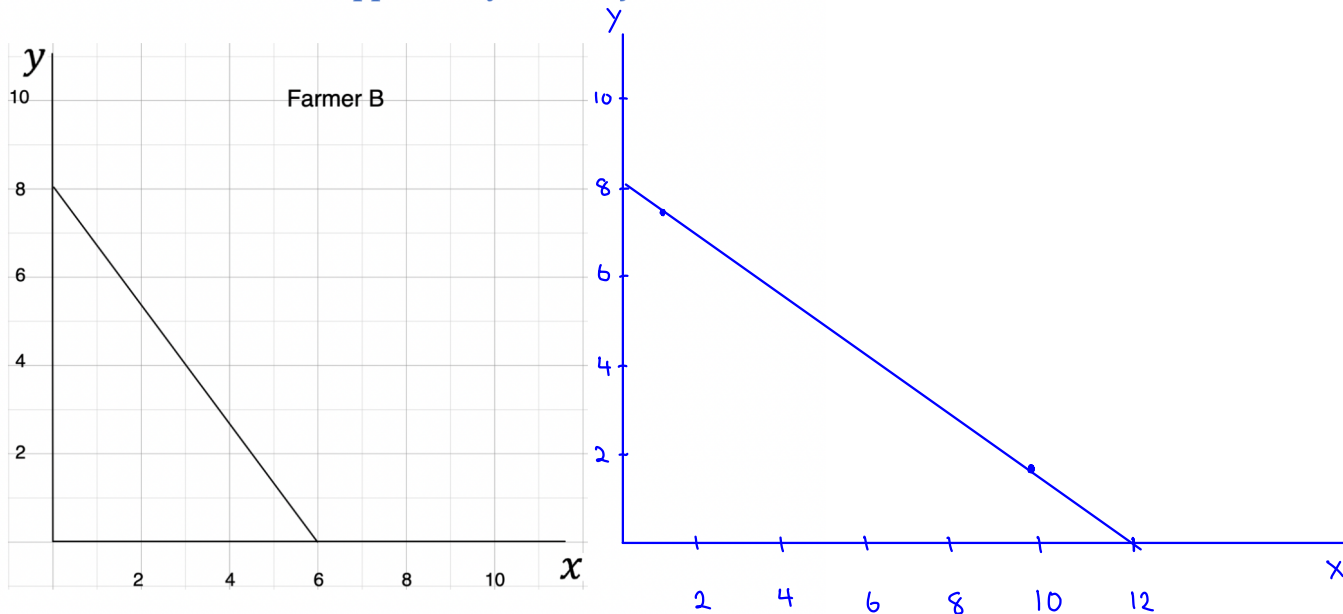
C slope = $-\frac{4}{4} \rightarrow x \uparrow 1 \text{ unit}, y \downarrow 1 \text{ unit}$

HW Farmer C has the PPC given below. Find the PPC of all three farmers A, B and C combined.



HW. If a new fertilizer is found to double the output of rice (x) for any level of production of fish (y), how will PPC of farmer B change? Does the opportunity cost of x increase? Does the opportunity cost of y increase?

$y \downarrow$ } opp. cost $\uparrow$
 $x \uparrow$



$$\Delta y = \text{slope} \cdot \Delta x \quad \text{New slope B} = \frac{\Delta y}{\Delta x} = -\frac{1}{1.5} = -0.6 \rightarrow x \uparrow 1 \text{ unit}, y \downarrow 0.6 \text{ unit}$$

$$-1 = -1.33 \cdot \Delta x \quad \text{Old slope B} = -1.33 \rightarrow x \uparrow 1 \text{ unit}, y \downarrow 1.33 \text{ unit}$$

$$\frac{1}{1.33} = \Delta x$$

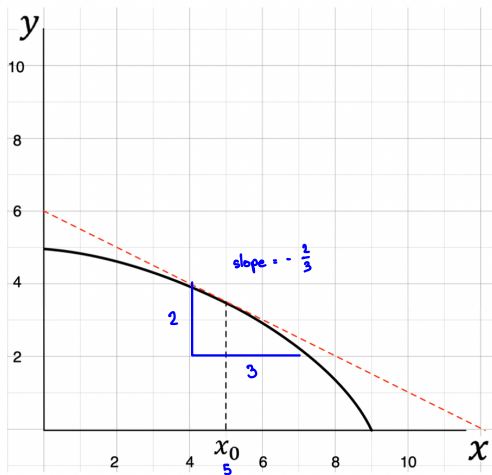
$$0.75 = \Delta x$$

$\therefore$ The opportunity cost of x decreases, but the opportunity cost of y increases

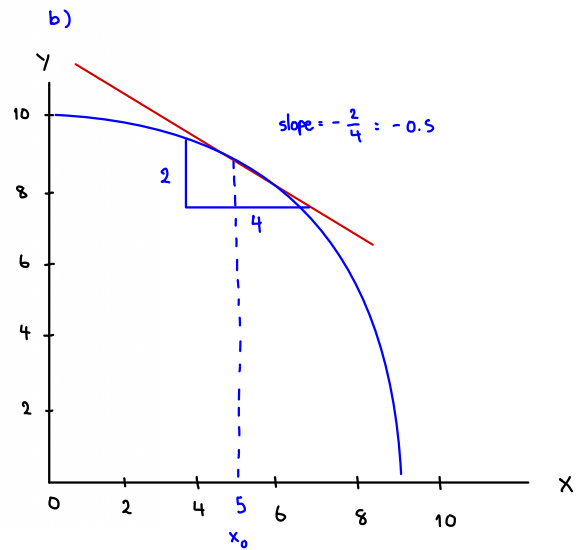
$y \downarrow 1 \text{ unit}, x \uparrow 0.75$ in this case $y \downarrow 1 \text{ unit}, x \uparrow 1.5 \text{ unit}$

HW. Given the PPC below,

- What is the opportunity cost of x at $x_0 = 5$?
- Suppose the technology of producing y improves so that the economy can double the output of y for any output level of x . Draw the new PPC.
- What is the opportunity cost of x at $x_0 = 5$ for the new PPC?



a) Opportunity cost of x at $x_0 = -\frac{2}{3} \approx -0.6$



b) Opportunity cost of x at $x_0 = -0.5$