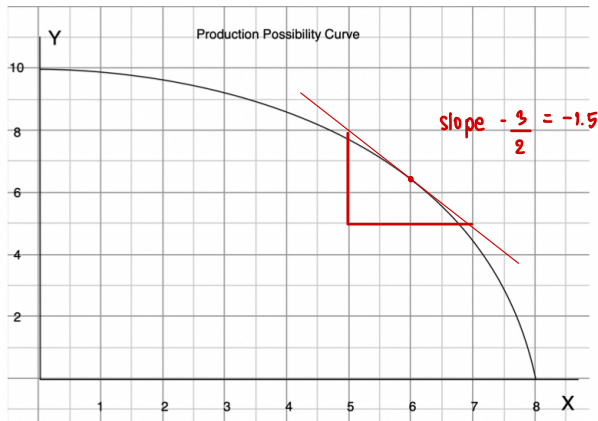


HW#4 Due Jan 27, 2022

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	0.2
3	7.45	0.25
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

The opportunity cost of Y is increasing.

- 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.

(c) At point E slope = -1.5

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

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

$$\Delta x = 0.6$$

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

(d) if y decrease by 0.2 unit, x will produce more by 0.13 unit

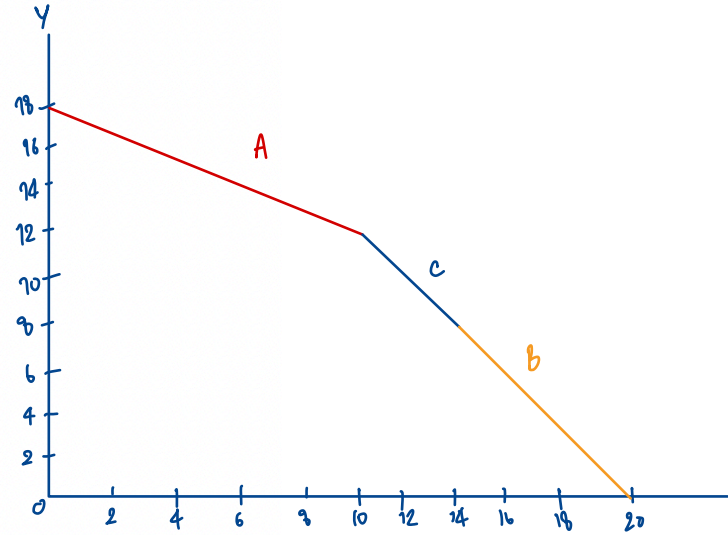
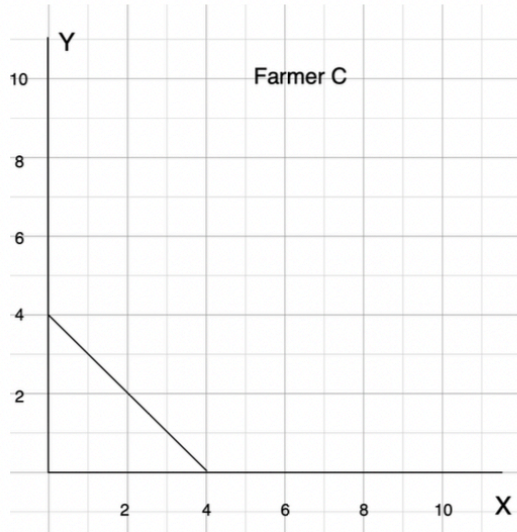
$$\Delta y = \text{slope} \cdot \Delta x$$

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

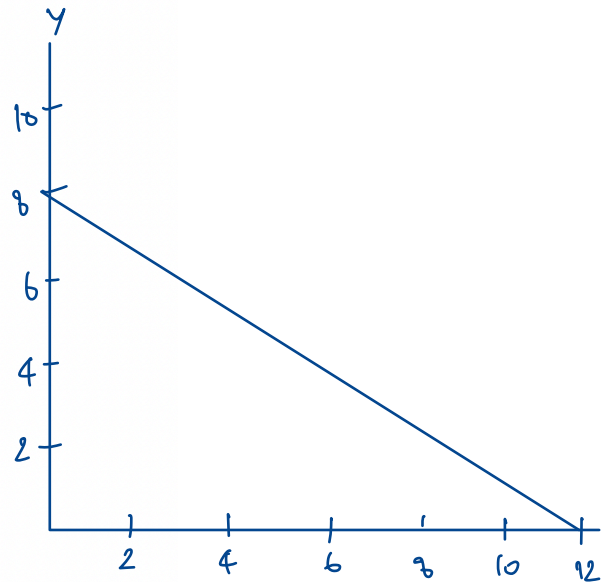
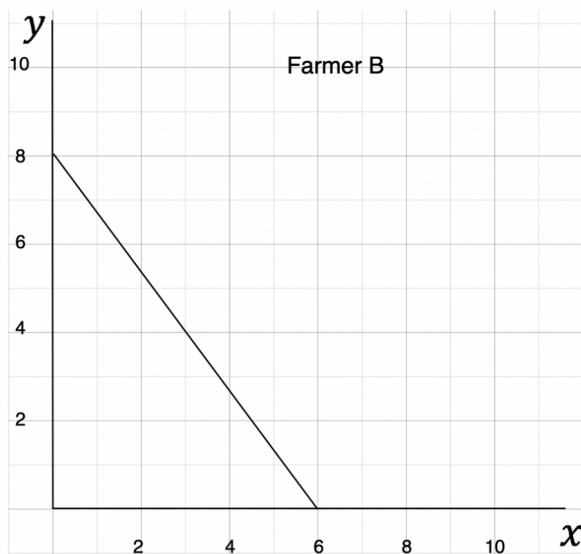
$$0.13 = \Delta x$$

$$\begin{aligned} \text{slope A} &= -\frac{6}{10} \rightarrow \uparrow 1 \text{ unit}, -y \downarrow 0.6 \text{ unit} \\ \text{slope B} &= -\frac{3}{6} \rightarrow \uparrow 1 \text{ unit}, -y \downarrow 1.5 \text{ unit} \\ \text{slope C} &= -\frac{4}{9} \rightarrow \uparrow 1 \text{ unit}, -y \downarrow 1 \text{ unit} \end{aligned}$$

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?



$$\begin{aligned} \Delta y &= \text{slope} \cdot \Delta x & \text{new slope B} &= \frac{\Delta y}{\Delta x} = -\frac{1}{1.5} = -0.6 \rightarrow x \uparrow 1 \text{ unit}, y \downarrow 0.6 \text{ unit} \\ -1 &= -1.5 \cdot \Delta x & \text{old slope B} &= -1.5 \rightarrow x \uparrow 1 \text{ unit}, y \downarrow 1.5 \text{ unit} \\ \frac{1}{1.5} &= \Delta x \end{aligned}$$

$$0.75 = \Delta x$$

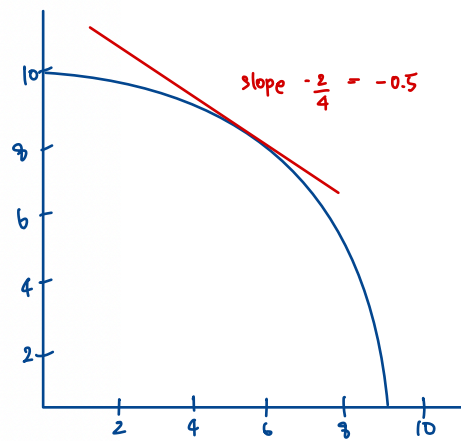
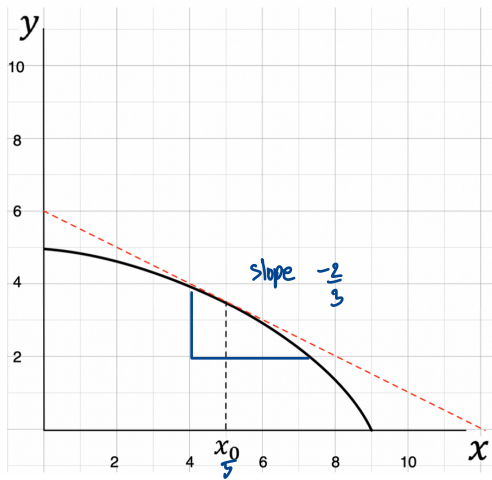
$$y \downarrow 1 \text{ unit}, x \uparrow 0.75 \rightarrow y \downarrow 1 \text{ unit}, x \uparrow 1.5 \text{ unit}$$

\therefore the opportunity cost of x decrease

but the opportunity cost of y increase

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?



- opportunity cost of x at $x_0 = -\frac{2}{3}$
- opportunity cost of x at $x_0 = -0.5$