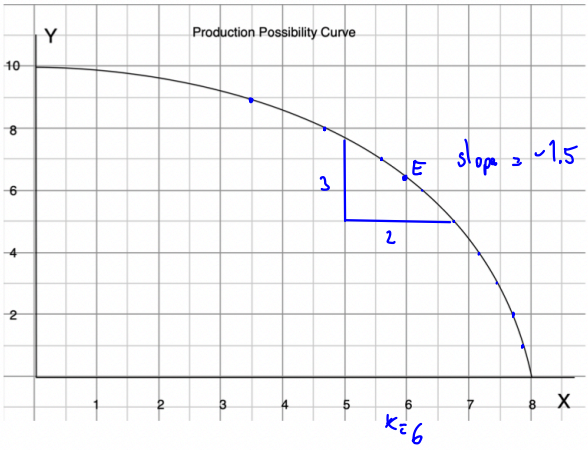
HW#4 Due Jan 27, 2022

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

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.) Yes, as we increase y from 0 to 8 the opportunity cost of y in term of X is increasing from 0.1, 0.2, 0.3, 0.4, 0.5, ...

c.) At point E slope = 1.5

$\Delta Y = \text{slope}\ \Delta X$

$3 = -1.5\ \Delta X$

$\Delta X = 0.6$

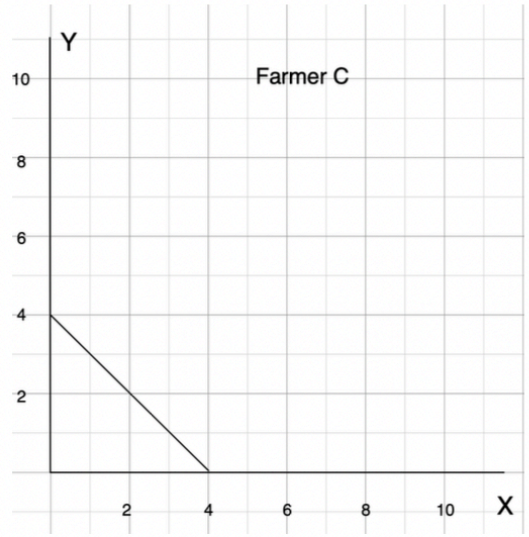
The opportunity cost per unit of y at $x=6$ is 0.6.#

d.) $\Delta Y = \text{slope} \cdot \Delta X$

$0.2 = -1.5\ \Delta X$

$\Delta X = 0.13$ #

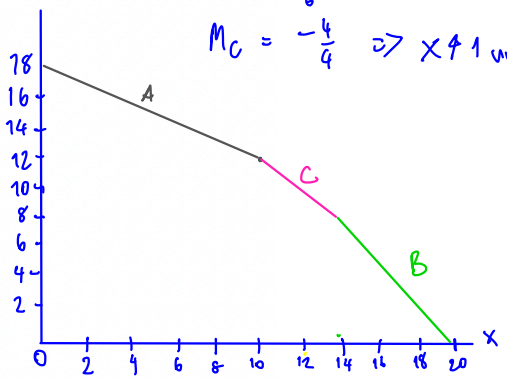
HW Farmer C has the PPC given below. Find the PPC of all three farmers A, B and C combined.



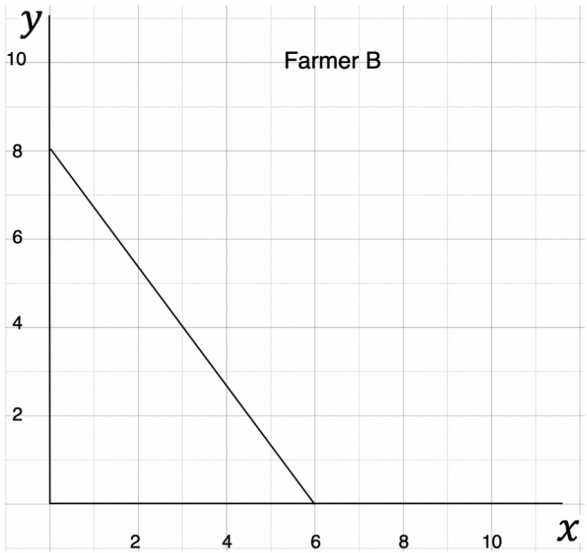
$M_A = \frac{-6}{10}$ ⇒ x↑ 1 unit, y↓ 0.6 unit

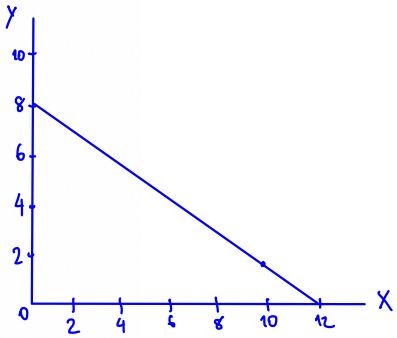
$M_B = -\frac{8}{6}$ ⇒ x↑ 1 unit, y↓ 1.3 unit

$M_C = -\frac{4}{4}$ ⇒ x↑ 1 unit, y↓ 1 unit



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?





Δy = slope Δx

$-1 = -1.33\,\Delta x$

$\Delta x = 0.75$

y↓ 1 unit, x↑ 0.75 unit ⇒ (New) y↓ 1 unit x↑ 1.5 unit

$M_{B_{new}} = \frac{\Delta y}{\Delta x} = \frac{-1}{1.5} = -0.6$ → x↑ 1 unit, y↓ 0.6 unit

$M_{B_{old}} = -1.33$ → x↑ 1 unit, y↓ 1.33 unit

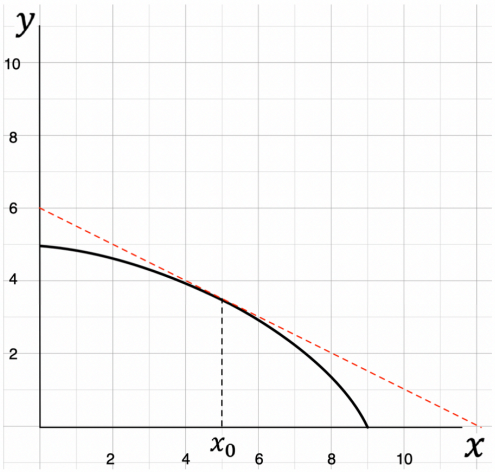
Opportunity cost of x decreases, but the opportunity cost of y increases.

HW. Given the PPC below,

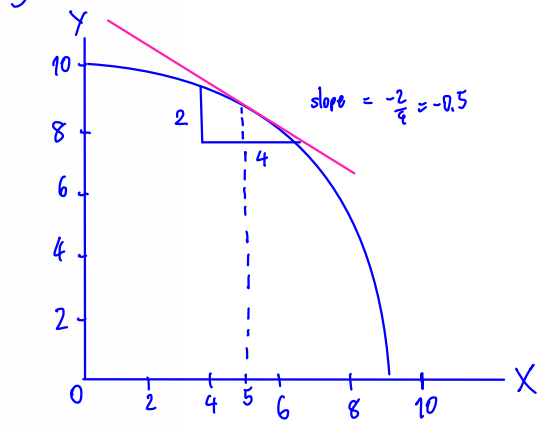
a) What is the opportunity cost of x at $x_0 = 5$?

b) 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.

c) What is the opportunity cost of x at $x_0 = 5$ for the new PPC?



b)



a) Opportunity cost of x at X_0 = $\frac{-2}{3} \approx -0.67$

c) opportunity cost of x at X_0 = -0.5