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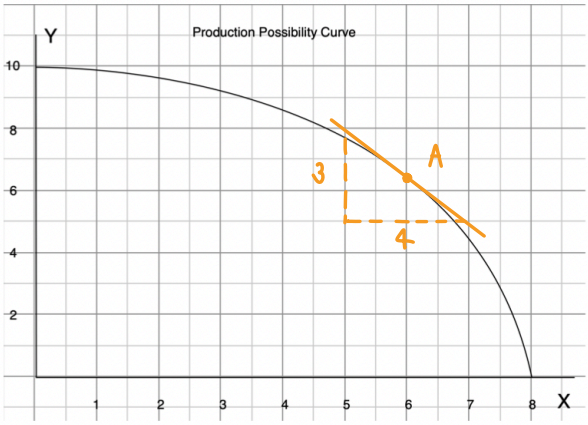
HW#4 Due Jan 27, 2022

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	7.9	8 − 7.9 = 0.1
2	7.7	0.2
3	7.45	0.25
4	7.15	0.3
5	6.75	0.45
6	6.25	0.5
7	5.6	0.65
8	4.65	0.95
9	3.4	1.25
10	0	3.4

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 0-10, the opp. cost of y— in term of X increase too.

c) @ point A, m = −0.75 which means if we have 1 unit more of y, we will have ≈ −0.75 less of X

ΔX

slope · (ΔX)

d) X = −0.2(−0.75)

= 0.15

Ans we will approximately 0.15 unit more of X.

Farm A $x_{max} = 10$ $y_{max} = 6$

Farm B $x_{max} = 6$ $y_{max} = 8$

Farm C $x_{max} = 4$ $y_{max} = 4$

$x_{all} = 20$ $y_{max} = 18$

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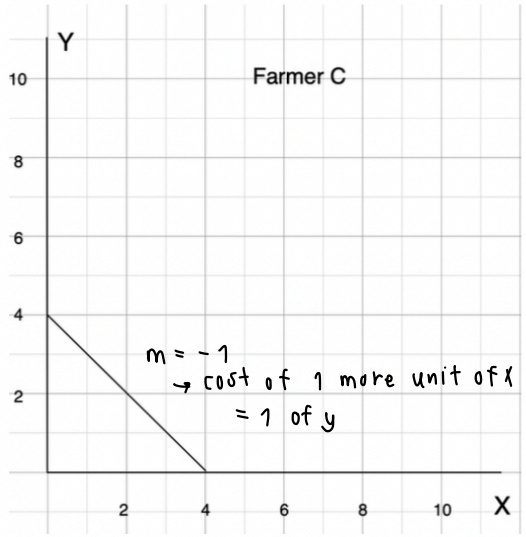
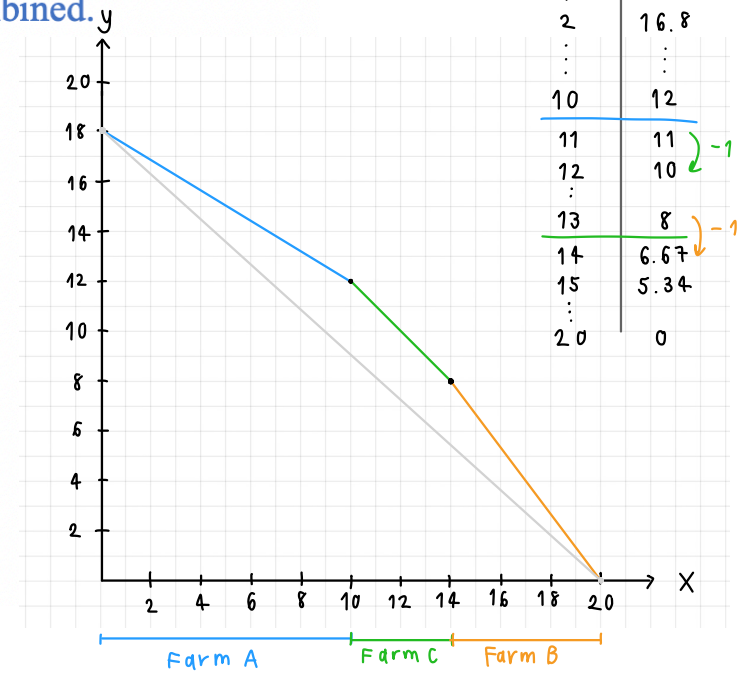
HW Farmer C has the PPC given below. Find the PPC of all three farmers A, B and C combined.



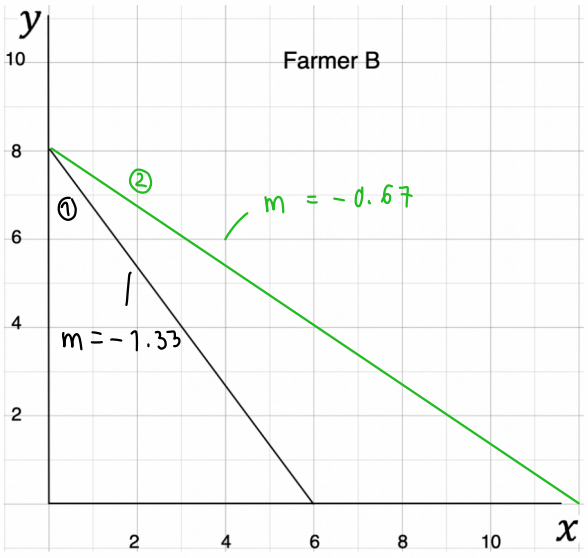
x	y
0	18
1	17.4
2	16.8
⋮	⋮
10	12
11	11
12	10
⋮	⋮
13	8
14	6.67
15	5.34
⋮	⋮
20	0

-0.6 -1 -1.33



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?

fish



rice

opp. cost of y / opp. cost of x $= -\frac{1}{1.33} = 0.75$

Before: line ①, $m = -1.33$ meaning that if we have 1 unit more of x, we will have ≈ 0.75 less of x

opp. cost of y / opp. cost of x $= \frac{1}{-0.67} = 1.49$

After: line ②, $m = -0.67$ meaning that if we have 1 unit more of x, we will have ≈ 1.49 less unit of y.

∴ The opp. cost that changes is the opp. cost of the fish.

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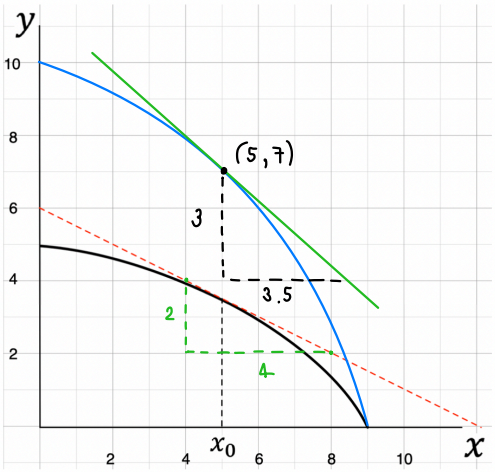
HW. Given the PPC below,
a) What is the opportunity cost of x at $x_0 = 5$?
b) Suppose the technology of producing y improves so that the economy can double the output of y for any output level of x. Draw the new PPC.
c) What is the opportunity cost of x at $x_0 = 5$ for the new PPC?



a) $m = -0.5$ Opp. cost of X ($X_0 = 5$) is -0.5
as we increase X by 1 unit, y will decrease 0.5 unit.

c) $m_{\text{new ppc}} = -\frac{3}{3.5} = -0.86$ opp. cost of X @ $X_0 = 5$ on the new ppc curve is -0.86. As we increase X by 1 unit, y will be decreased by 0.86 unit.