Slide 3

Module 2: Class Notes

Examples of Model:

A) Consumer Utility Maximizing Model:

1 good: $\max_{x \geq 0} u(x)$ s.t. $P_x x \leq I$

2 goods: $\max_{x_1, x_2 \geq 0} u(x_1, x_2)$ s.t. $P_1 x_1 + P_2 x_2 \leq I$

where, $u(x)$ = utility gained from consuming x

x = amount of good x

P_x = price of x

I = Income

B) Firm Profit Maximizing Model:

1 good: $\max_{x \geq 0} \pi \quad P_x f(x) - cx$

2 good: $\max_{x_1, x_2 \geq 0} \pi \quad pf(x_1, x_2) - c_1 x_1 - c_2 x_2$

where, P_x = price buyers will pay for good x

$f(x)$ = production output of good x

c = cost to produce good x

Slide 5: Trade-offs, The PPF

Know that this is a line

$\Rightarrow$ takes the form of $y = mx + b$

Know: $b = 30$ & that an efficient equilibrium allocation is $(x, y) = (20, 15)$

$\Rightarrow \quad 15 = m(20) + 30$

$-15 = m(20)$

$\Rightarrow \quad m = \frac{-15}{20} \quad \Rightarrow \quad m = -\frac{3}{4}$ $\Rightarrow$

⇒ Our Feasible and Efficient allocations will be on the PPF line of:

$$y = -\frac{3}{4}x + 30$$

⇒ For every 1 more small jet you produce, you will have to give up 3/4 of a Dreamliner because

$$m = -\frac{(3/4)}{1}$$

Slide 8:

With the example given above, suppose Boeing wants to produce 8 more small jets (i.e. $a \to b \Rightarrow 20 \to 28$), this means that

$20 \to 28 \Rightarrow +8$ more small jets

which implies $15 \to 9 \Rightarrow -6$ Dreamliners

(or) $\frac{-6}{8} = -\frac{3}{4} = m$ from above!

Slide 9: Learn By Doing (LRD) Practice Question 1

Assume; - we can harvest 100 clams in 1 week
- " " " 200 mangos in 1 week

Note: when they say assume you can harvest fractional goods, this just means that all of the "bundles" on the PPF are feasible. I give an example below.

Knowing the relationship is linear, we can plot this:

Let, x = amount of mangos
y = amount of clams

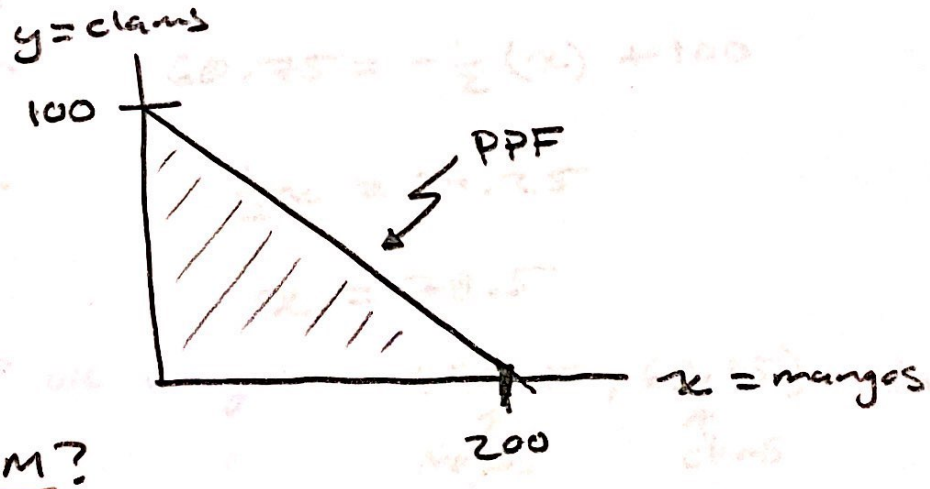
① If we harvest 200 mangos, we get 0 clams.

$\Rightarrow$ x-axis intercept = $(200, 0)$

② If we harvest 100 clams, we get 0 mangos

$\Rightarrow$ y-axis intercept = $(0, 100) = b$

$\Rightarrow$



③ what is M?

$y = mx + 100$

plug in $(200, 0)$ $\quad 0 = m(200) + 100$

$\Rightarrow \quad -100 = m\,200$

$\Rightarrow \quad m = -\frac{100}{200} = -\frac{1}{2}$

$\Rightarrow$

⇒ our PPF (is a line) equation is:

$$y = -\frac{1}{2}x + 100$$

Note: Another way to get m!

We know it is negative because it is a trade-off, so

$$m = -\frac{(y\text{-intercept})}{(x\text{-intercept})} = -\frac{(100)}{(200)} = -\frac{1}{2}$$ //

(*) Why is having this equation important?

Because it will give us the amount of x or y we can feasibly & efficiently produce given an x or y.

Ex Say we want 100 mangos

$$\Rightarrow \quad y = -\frac{1}{2}(100) + 100 = 100 - 50 = 50 \text{ clams}$$

⇒ In 1 week, you can get (100, 50) (100 ↑ mangos, 50 ↑ clams)

Ex Say we want 60.75 clams

$$\Rightarrow \quad 60.75 = -\frac{1}{2}(x) + 100$$

$$\Rightarrow \quad \frac{1}{2}x = 39.25$$

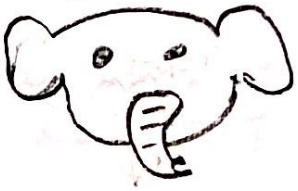
$$x = 78.5$$

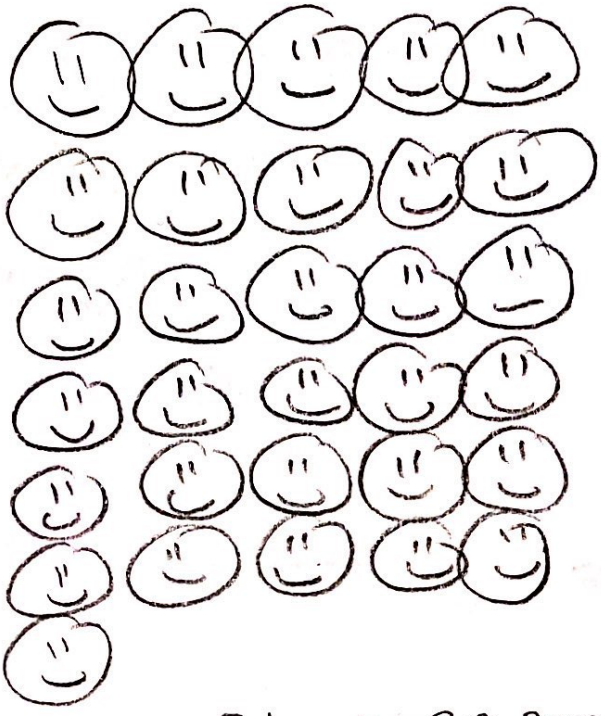
⇒ we can get (78.5, 60.75) in 1 week time! (78.5 ↑ mangos, 60.75 ↑ clams)

Slide 10: LBD Practice Question 2

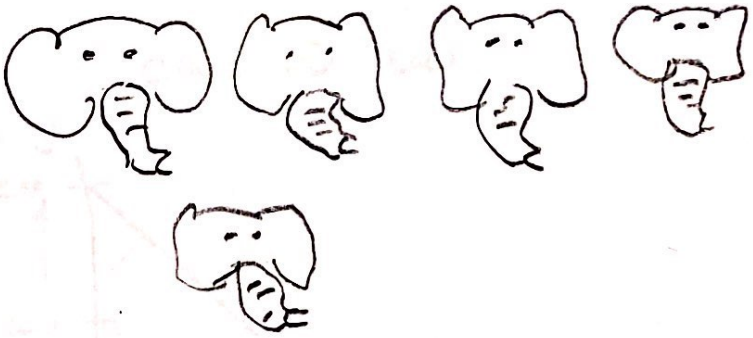
Smiley:

Elephants:





= 31 per 30 seconds

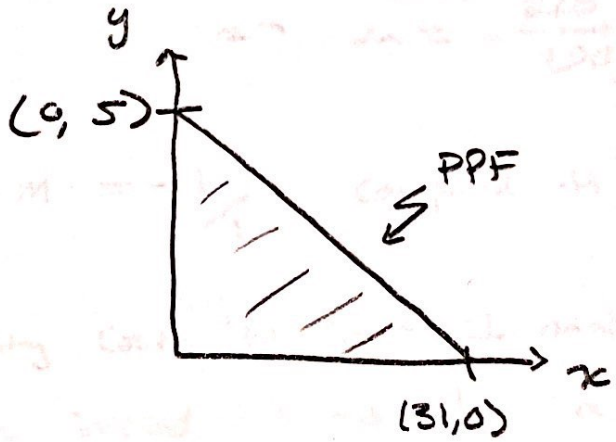


= 5 per 30 seconds

=> let y = elephants => (0, 5)

x = smiles => (31, 0)

=>



$y = mx + 5$

$0 = m(31) + 5$

$\Rightarrow m = -\frac{5}{31}$

Where, for every 31 smiles, I will have to give up 5 elephants

OR $m = \frac{-(5/31)}{1}$

=> For every 1 more smile, I will have to give up $(5/31)$ elephants.

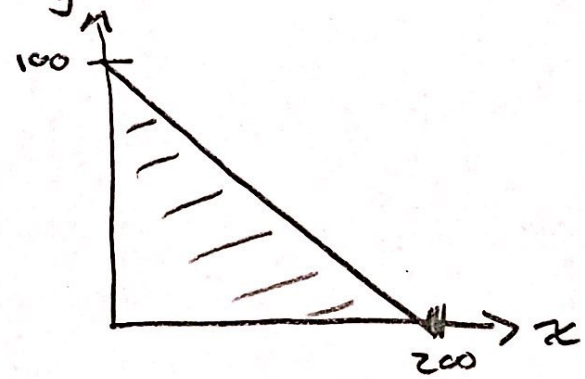
Slide 12: Economic Growth w/ mangos & clams

Say that we can now produce 200 clams per week instead of 100. What Does that do?

⇒ Clams @ 100

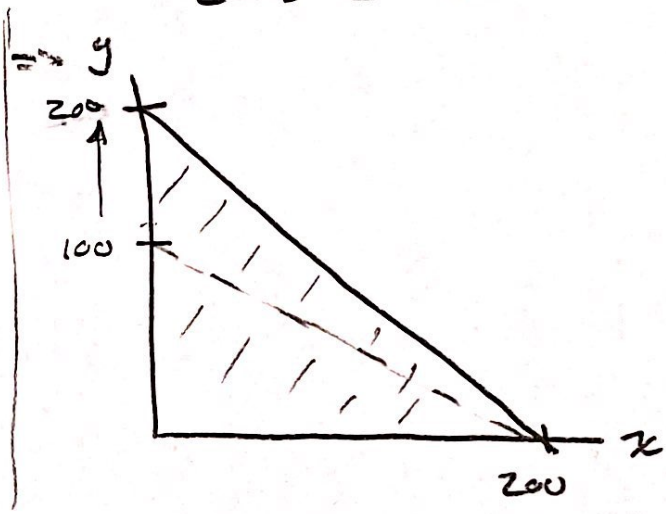
⇒ $y = -\frac{1}{2}x + 100$

⇒



Clams @ 200

⇒



$\Rightarrow y = mx + 200$

plug in (200, 0) $\Rightarrow 0 = m(200) + 200$

$\Rightarrow -200 = m200$

$\Rightarrow m = -\frac{200}{200} = -1$

$\Rightarrow m = -\frac{1}{1}$ compared to $m = -\frac{1/2}{1}$

⇒ Opportunity cost to gain 1 mango is now giving up 1 clam instead of 1/2 a clam.

Opportunity cost to gain 1 clam is now 1 mango instead of 2 mangos.