

Mathematical Economics Seminar

Functions

$f(n) = a^n$
always 1/n ..

Cost functions

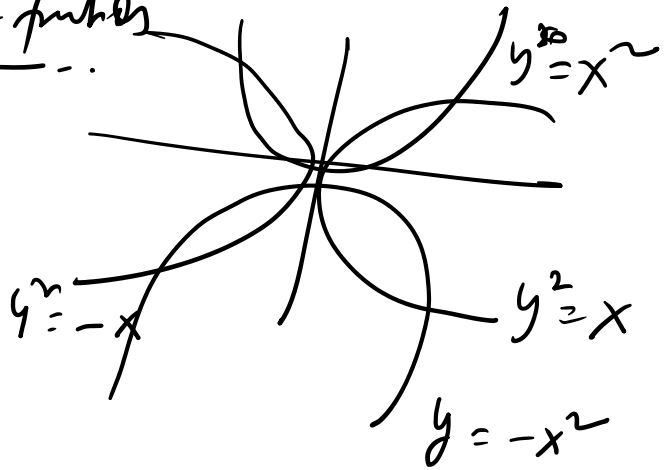
$C = 25 + 38 + 7q$ → Fixed Cost.
● SRCF

~~Ex 200~~ $C = f(Q) = C_1 + n_1 Q + n_2 Q^2$

→ format of a Quadratic function ..

2 values.
+ve / +ve
+ve / -ve
-ve / -ve

Graph of a quadratic function ..

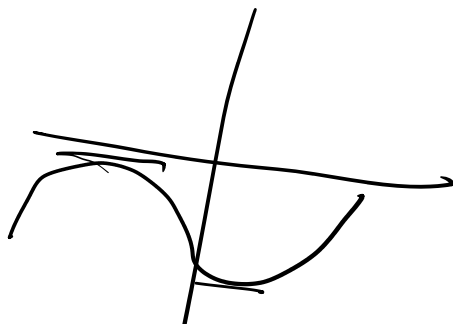


Butterfly format of a quadratic equation ..

Cubic

$f(x) = a + bx + cx^2 + dx^3$

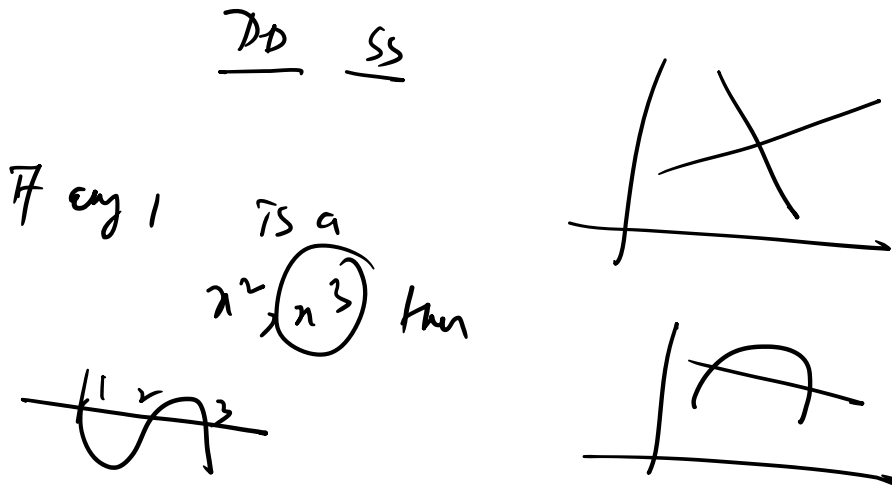
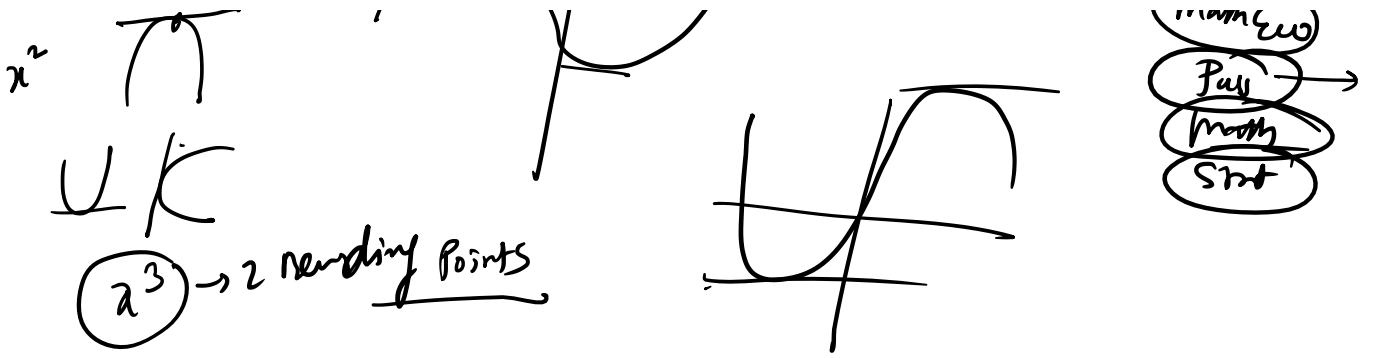
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- Sem →
- Micro
- Math Eco
- Pay →

x^2

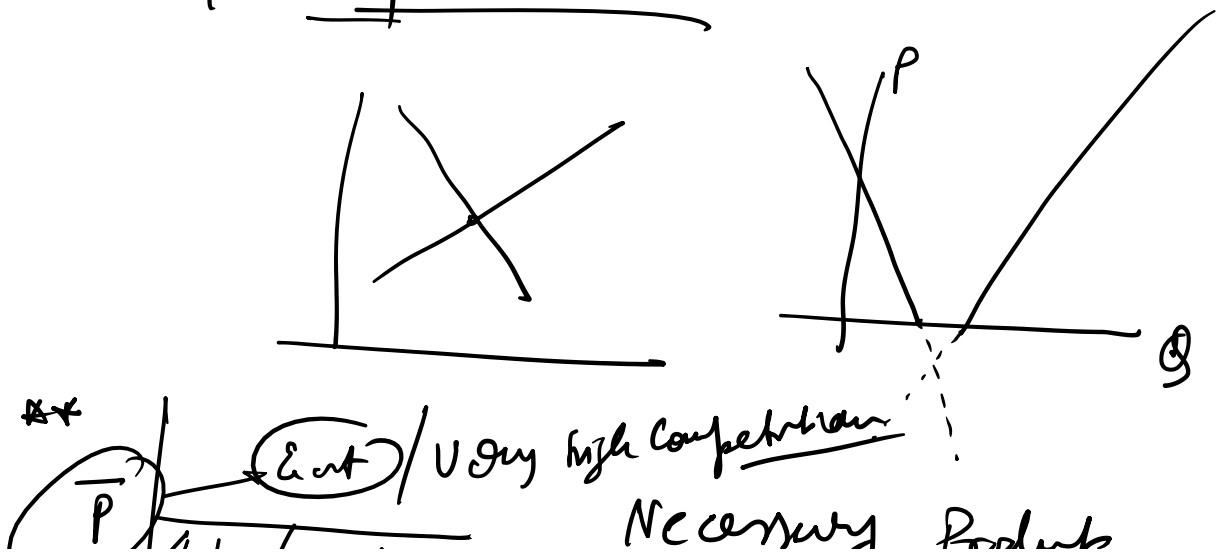


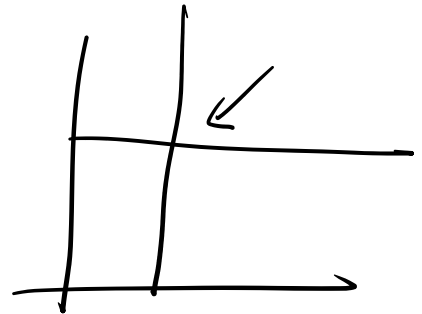
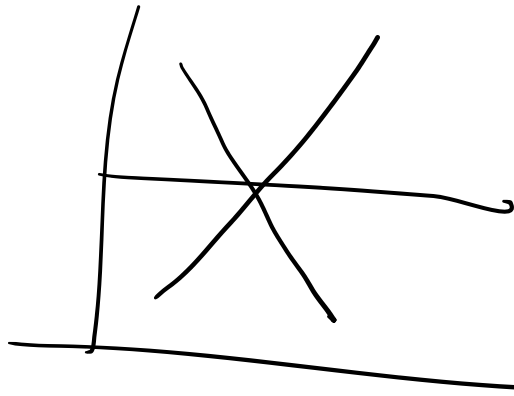
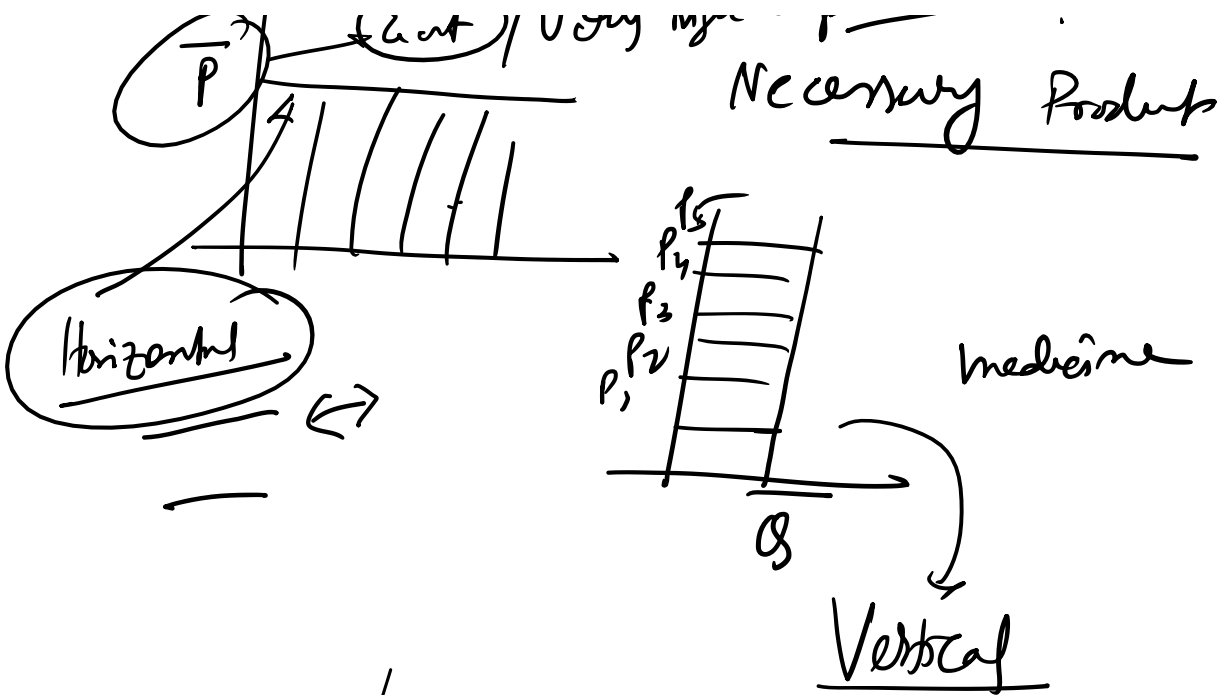
So, the highest Power is the divider.

Exponential form

$$y = a^x \quad (a > 1)$$

Equilibrium of a market





Greater Lower Bound

GLB

$$\left. \begin{array}{l}
 3 \leq Q_1 \leq 10 \\
 0 \leq Q_2 \leq 15 \\
 \textcircled{5} \leq Q_3 \leq 18 \\
 2 \leq Q_4 \leq 16 \\
 4 \leq Q_5 \leq 40
 \end{array} \right\}$$

Shop

find a Common Range of Q

Least Upper Bound

maximin or mini-max

$$p = 4 - \frac{1}{3}q$$

$$0 = 4 - \frac{q}{3}$$

$$q = 9$$

If the product is available at free then find $q = ?$

$$u = 4 - \frac{1}{3}$$

$$4 = \frac{12}{3}$$

$$\boxed{9 = 12}$$

find $q = ?$

$$\underline{Y - tax = Y_d}$$

Answer

$$C = 20 - 0.5Y_d$$

$$I = 0.1Y \quad T = 0.3Y$$

find the equilibrium income.

$$Y = C + I$$

$$Y = 20 - 0.5Y_d + 0.1Y$$

$$Y = 20 - 0.5(Y - T) + 0.1Y$$

$$Y = 20 - 0.5(Y - 0.3Y) + 0.1Y$$

$$Y = 20 - 0.5(0.7Y) + 0.1Y$$

$$Y = 20 - 0.35Y + 0.1Y$$

$$\cancel{Y} + 1.25Y = 20$$

$$Y = \frac{20}{1.25} = 16$$

Next

$$p^d = 3 - 4q$$

$$p^s = -4 + 3q$$

What happens at eqm??

This eqn
don't use...

$$pd = ps$$

$$@ q = 21$$

$$pd = 3 - 4 = -1$$

$$3 - 4q = -4 + 3q$$

$$7 = 7q$$

$$q = 1$$

Suprema & Infima of a set ...

$$U_n = \frac{4+n}{n} \quad n \in \mathbb{N}$$

$$U_n = \frac{4}{n} + 1$$

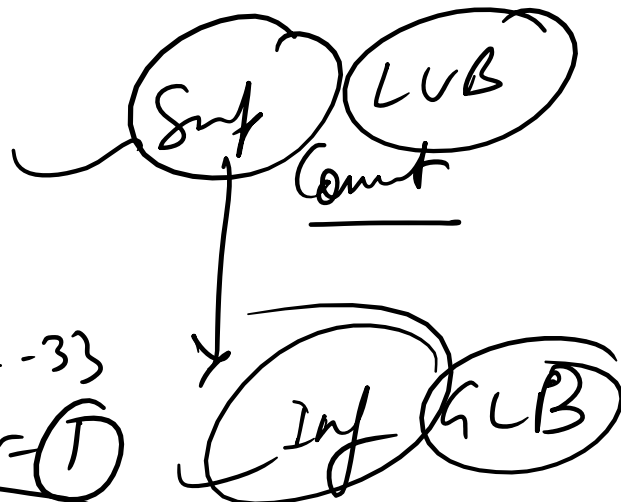
$$U_1 = \frac{4}{1} + 1 = 5$$

$$U_2 = \frac{4}{2} + 1 = 3$$

$$U_3 = \frac{4}{3} + 1 = 2.33$$

$$U_\infty = \frac{4}{\infty} + 1 = 1$$

Concavity vs Convexity



$$f(x)$$

$$f'(x)$$

$$f''(x) > 0$$

$$f''(x) < 0$$

f is Concave upward

Concave downward

$$f''(x) < 0 \quad \text{Concave Down}$$

$$f''(x) = 0 \quad \text{at line}$$

Point of inflexion \rightarrow A point at which a curve changes curvature

Concave \rightarrow Convex

$$y = f(x) = x^3 - 3x^2 + 2x \quad (x, y)$$

$$f'(x) = 3x^2 - 6x + 2$$

$$f''(x) = 6x - 6 = 0$$

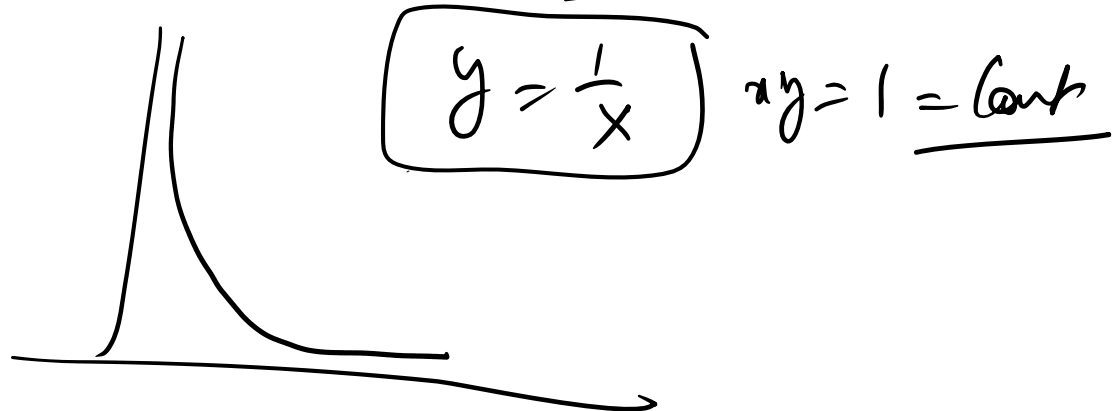
$$x = 1$$

$$(1, 0)$$

$$\text{at } x = 1$$

$$y = 1^3 - 3 + 2 = 0$$

Rectangular Hyperbola



Demand

$$p = 10 - q \quad 0 < q \leq 3$$

$$= 13 - 2q \quad q > 3$$

$$TR = pq = 10q - q^2$$

$$= 13q - 2q^2$$

$$\frac{d(TR)}{dq} = MR$$

$$10 - 2q$$

$$13 - 4q$$

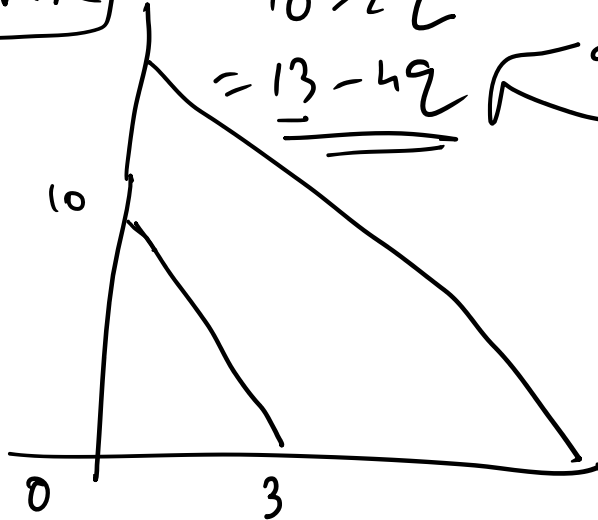
MR

$$10 - 2q$$

$$0 < q \leq 3$$

$$= 13 - 4q$$

$$q > 3$$



Flatter vs Steeper

flatter $y = 2x$

$$y = 4x$$



Steeper

