# MATHEMATICAL ECONOMICS

- Sets and Set operations; functions and their properties; number systems.

- Convex sets; geometric properties of functions: convex functions, their characterizations, properties, and applications; further geometric properties of functions: quasi-convex functions, quasi-concave functions, their characterizations, properties, and applications.

- Limit and continuity-Different Limit Theorems with proof-concept of first principle.

- Uses of the concept of continuity.

Set: A collection of **elements which are identical in nature**

R^+: $Real\ Numbers\ (\ Positive\ Integers + Zero + Negative\ Integers +$
$Rational\ Numbers + Fractions)$

Quantity: **Grape**
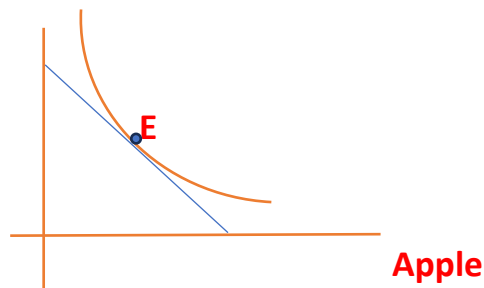
$Consumption\ Bundle$: **(Apple, Grape) : (x,y)**

Open Set (Unbound Set) / Closed Set (Bounded):

A: (0, 1, 2, 3) : $(0 < a \leq 3)$

B: (0, 1, 2, 3, ...)

C: (........, 1,2,3)

D: (.............., 1,2,3...................)

X: Amount of Apple consumed

Y: Amount of Grape Consumed

Price-quantity combination: (p, Q)

$$< (p, Q) <$$

Sub-set:

Variables: Choice variables

Functions:

1) Function of a single variable

2) Function of two variable

3) Function of more than two variables

Convexity and concavity of

a) Set

b) Function

Unconstrained Optimisation / Comparative Static Analysis

Convexity and concavity of

4) Function of a single variable

5) Function of two variable

6) Function of more than two variables

Checking Concavity & Convexity

Quasi-concavity & Quasi-convexity

Limit & Continuity of Functions

Constrained Optimisation

Convexity and concavity of

1) Function of a single variable

2) Function of two variable

3) Function of more than two variables