CONICS
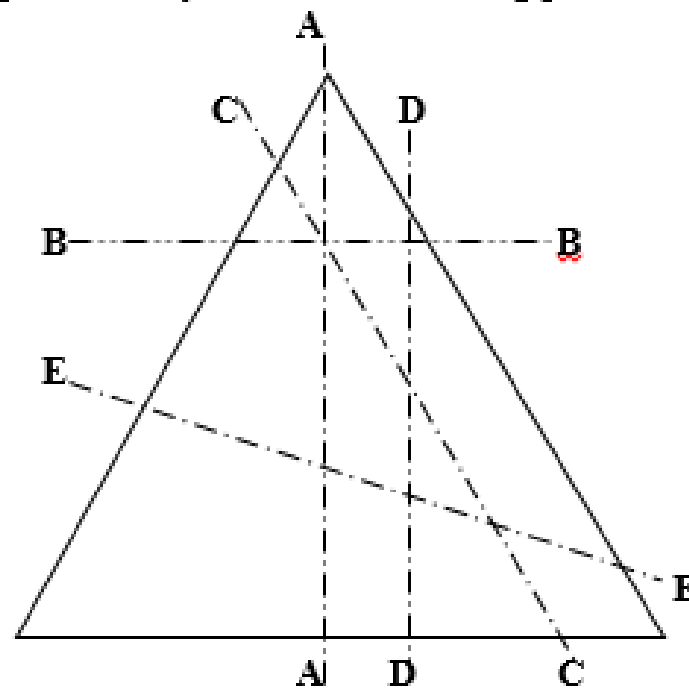
Conics - is that part of geometry that deals with the cone and the several curves formed by truncation of it.

Vertex or Apex

Element

Generator →

Altitude
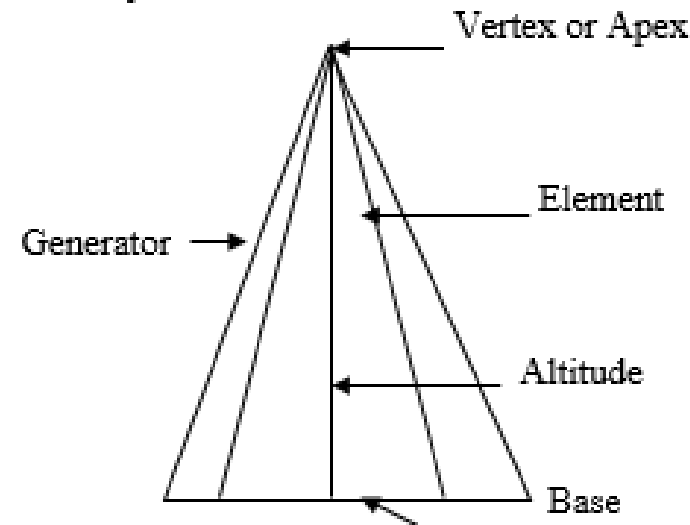
Base

The element of a cone – is a line drawn from the apex to a point on the circumference of the base.

Conic sections produced by the different cutting planes.

A
C   D
B—————————B
E
E
A   D   C

AA – Triangle – formed when a cutting plane cuts along the axis.

BB - Circle - formed when the cone is cut at right angles to the axis.

CC - Parabola - formed when a right cone is cut by a cutting plane parallel to a generator of a cone.

DD - Hyperbola – formed when a right cone is cut by a plane which makes a greater angle with the base than a generator of a cone makes.

EE - Ellipse - formed when a right cone is cut by a plane which goes right through a cone; in other words, it cuts through every generator.

Eccentricity - is the ratio of the distances from the focus to a point on the curve and the directrix to the same point on the curve.

Q   P
F

D   V   F

$$Ecc = \frac{FP}{PQ}$$
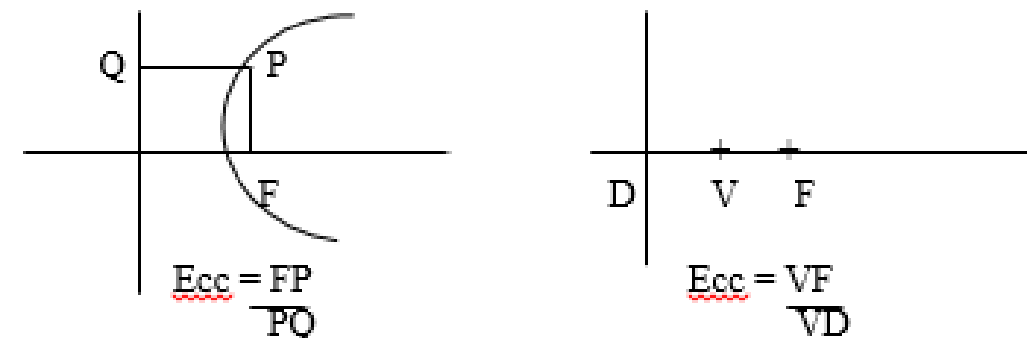
$$Ecc = \frac{VF}{VD}$$

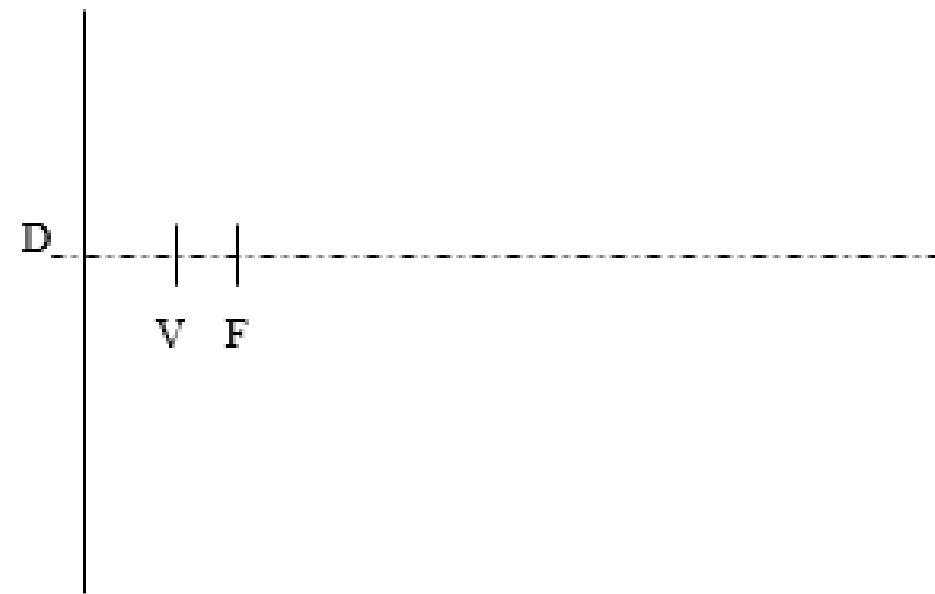| **Ecc < 1 Ellipse**	**Ecc > 1 hyperbola**	**Ecc = 1 parabola**

Example: VF = 12 and VD = 10.

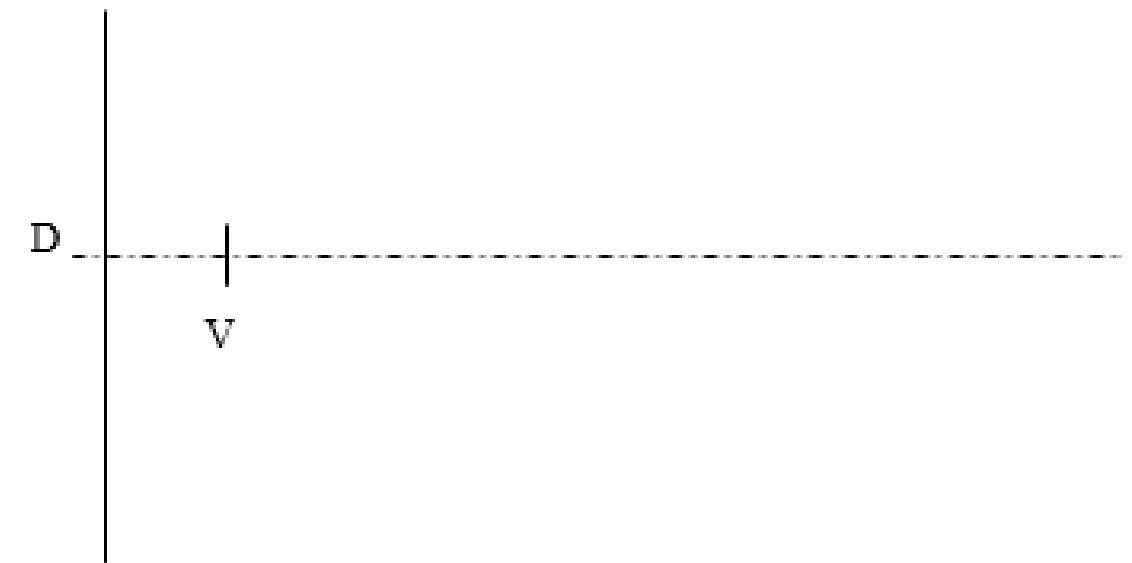$$Ecc = \frac{VF}{VD} = \frac{12}{10} = 1.2$$

1.2 > 1   therefore curve will be a hyperbola.

Focal sphere - is a sphere dropped into a cone that is also tangential to the cutting plane in question.
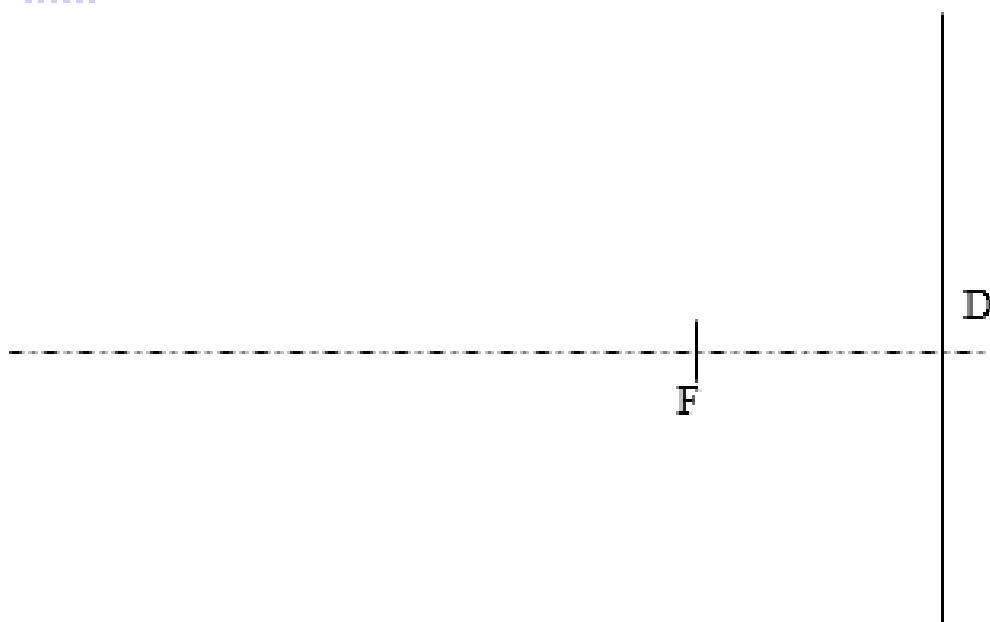
Given the **axis**, a **directrix**, a **vertex** and a **focal point** construct the ellipse.

D

V F

Given the **axis**, a **directrix** and a **vertex**, construct an **ellipse** with a **ratio of eccentricity of 2:3.**

D

V

Given the **axis**, a **directrix** and a **focal point**, construct an **ellipse** with a **ratio of eccentricity of 3:4.**

D

F

Given the **axis**, a **vertex** and a **focal point**, construct an **ellipse** with a **ratio of eccentricity of 2:3.**

V F