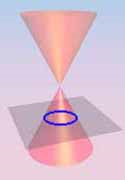
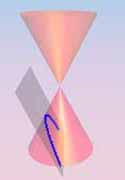
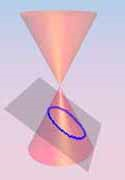
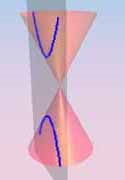
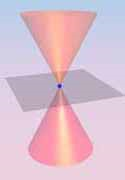
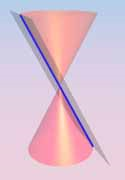
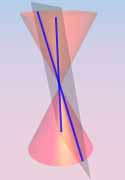
**CONICS**

***Definition:***   
A conic section is the intersection of a plane and a cone. By changing the angle and location of intersection, we can produce a circle, ellipse, parabola or hyperbola; or in the special case when the plane touches the vertex: a point, line or 2 intersecting lines.

CIRCLE ELLIPSE PARABOLA HYPERBOLA

POINT LINE PAIR of STRAIGHT LINES

**General Equation of Conic**

**Detail Classification of Conics**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Case** | **Condition of Invariants** | **Types of Locus** | **Required form of equation** | **Reduces form of equation** |
| **Proper Conic:** | ; a=b, h=0 | **Circle** | **++++** |  |
|  | **Ellipse** | **+ = 1** | **++ = 0** |
|  | **Hyperbola** | **= 1** | **++ = 0** |
|  | **Parabola** |  |  |
|  | **No real locus** |  |  |
| **Degenerate Conic:** |  | **A pair of straight lines** | **++++** |  |

Determinant **= =**



**, *C,*** and ***I*** are invariants under transformation.



**Invariant:** a relationship that is not changed by a designed mathematical operation such as transformation of coordinates (unchanged/constant/not varying).

**Locus:** the set of all points, lines, or surfaces that satisfy a given requirement.

# Conic Section

**Practice Sheet – Mat 110**

**Problems :**

1. Reduce the equation to its standard form:

i)

ii)

iii)

iv) 

v) 

vi) 

2. Find the center of the conic 