S.RAMANATHAN ASST PROF MVSREC
Mob:9989717732 rama_bhp@yahoo.com

Overview of Conic Sections by General method

While preparing for conic sections, the following steps are to be followed:

1) What is the distance between the focus and directrix?
(A) This distance is taken as DF.

2) What is the eccentricity of the given curve?
(A) To calculate eccentricity, we use the definition of eccentricity

e= PF/PD

PF is the distance of the point P from Focus (fixed point)
PD is the distance of the point P from the directrix (fixed line).

Note: In the problems, the ratio of PF/PD has to be found.

This may be given in a statement form in terms of
(i) ratio of distances between **fixed point** and **fixed line** (**PF/PD**)
(ii) ratio of distances between **fixed line** and **fixed point** (**PD/PF**).

For all conic sections, we have to remember that ***e= PF/PD***

And hence using the statement of problem we can find **e**.

If ***$e<1$*** → ***the curve is Ellipse***
$e=1$ → ***the curve is Parabola***
$e>1$ → ***the curve is Hyperbola.***

E.g.:
1) A point P moves such that its **distance** from **fixed point** is **2/3** times its **distance** from the **fixed line**. **Trace the path of point P** when **fixed point** is 50 mm away from **fixed line**.

(A) Here, **DF= 50** mm; Relation is **PF= 2/3 PD** and hence **e= PF/PD** = **2/3 ($e<1$)** ; Curve is **Ellipse**.

2) A point P moves such that its ratio of its distance from **fixed line** to its distance from the **fixed point** is **2/3**. Trace the path of point P when fixed point is 50 mm away from fixed line.

(A) Here, **DF= 50** mm; Relation is **PD= 2/3 PF** and hence **e= PF/PD** = **3/2 ($e>1$)**; Curve is **Hyperbola**.

S.RAMANATHAN ASST PROF MVSREC
Mob:9989717732 rama_bhp@yahoo.com

Steps of **Construction** by the **General method** are as follows:

1) Draw a straight vertical line AB of any length (directrix).
2) Draw a horizontal line DC perpendicular to AB (Axis) at any point.
3) From D, mark F (Focus) at given distance from AB (Directrix).
4) Take **e=PF/PD** (e=m/n) and hence divide DF into (m+n) no. of equal parts.

   E.g. If e=2/3, then divide DF into (2+3) = 5 equal parts.

5) Mark V (Vertex) at m^{th} part after F.
   (e.g.: if e=2/3, then V is 2^{nd} part after F).
6) Draw VE ⊥ VF such that ***VE=VF***.
7) Join DE and extend it.
8) On the axis, mark a no. of points after F at 10 mm each and label them as 1, 2, 3, etc.
9) On 1, 2, 3, etc draw vertical lines to cut the Line DE extended at 1', 2', 3', so on.
10) To get points of the curve, we need to draw arcs.
11) For all arcs, centre is F (focus); Radius is 1-1', 2-2', 3-3', etc.
12) With F as centre and radius = 1-1', cut arc on line 1-1'. Similarly 2-2', 3-3' etc cut arcs on lines 2-2', 3-3',etc and label the points as P_1, P_1',etc above and below the axis.
13) Join all these points to get the required conic section.

***Tangent and Normal to the conic sections*:**

1) Mark the point M where we want to draw tangent and normal either from the directrix or from the focus.
2) Join MF and at F, draw a line ⊥ to MF to cut the directrix at T. T is the starting point of the tangent. Join TM & extend to get Tangent TT'.
3) Draw the normal NN' ⊥ to the tangent TT' at M.