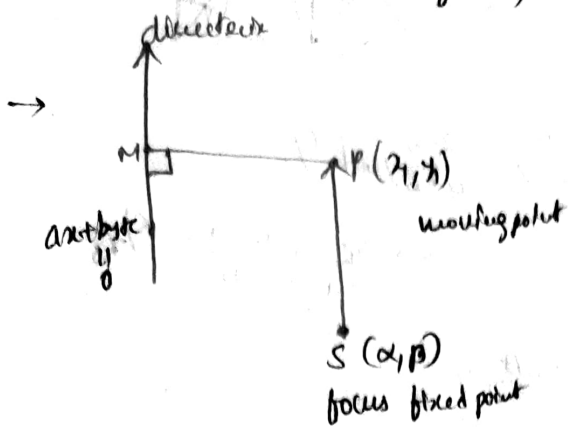# Conic section

→ fixed point is called focus, fixed line is called directrix

$$\frac{SP}{PM} = e \to f \cdot D$$

$e \Rightarrow$ eccentricity

$$SP^2 = e^2 PM^2$$

→ $(a^2+b^2)\left[(x_1-\alpha)^2+(y_1-\beta)^2\right] = e^2\left(ax_1+by_1+c\right)^2$

$$(x_1-\alpha)^2+(y_1-\beta)^2 = e^2\left|\frac{ax_1+by_1+c}{\sqrt{a^2+b^2}}\right|^2$$

General eqn of conic ⇒ $ax^2+2hxy+by^2+2gx+2fy+c=0$

→ **Nature of conic:**

If $\Delta = abc+2fgh-af^2-bg^2-ch^2 \neq 0$ it is a conic

① $e>1$ & $h^2>ab$ pair of real & distinct lines

② $e=1$ & $h^2=ab$ pair of real & concurrent lines

③ $e<1$ & $h^2<ab$ Imaginary & pair of lines

Case 2:

① $e=1$, $h^2=ab$ → parabola

② $e>1$, $h^2>ab$ → hyperbola

③ $e=\sqrt{2}$, $a+b=0$, $h^2>ab$ → rectangular hyperbola

④ $0<e<1$, $h^2<ab$ → ellipse

⑤ $a=b$, $e=0$, $h=0$ → circle

⑥ $e=\infty$ → pair of lines

→ centre of conic is a point through which every chord is bisected applicable for any conic.