	$\left(-ae, \pm\frac{b^2}{a}\right)$	$\left(\pm\frac{b^2}{a}, -ae\right)$	$\left(\alpha - ae, \beta \pm \frac{b^2}{a}\right)$
Parametric	$(a\sec\theta, b\tan\theta)$	$(b\tan\theta, a\sec\theta)$	$(\alpha + a\sec\theta, \beta + b\tan\theta)$

(1) $If\ P(x,y)\ be\ a\ point\ on\ the\ foci\ S\ \&\ S',\ then\ SP = ex - a; S'P = ex + a; SP - S'P = 2a.$

(2) $Any\ point\ on\ the\ hyperbola\ \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1\ \ is\ (a\sec\theta, b\tan\theta)$.

(3) $The\ rectangular\ hyperbola\ is\ x^2 - y^2 = a^2.$

$Its\ transverse\ axis\ \to X - axis; Conjugate\ axis\ \to Y - axis$

$Eccentricity\ \to \sqrt{2}\ ; Length\ of\ T - axis\ \&\ C - axis\ \to 2a.$

(4) $The\ two\ hyperbola\ \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1\ \&\ \frac{y^2}{b^2} - \frac{x^2}{a^2} = 1\ are\ conjugate\ to\ each\ other.$

$Eccentricity\ \to b^2 = a^2({e_1}^2 - 1)\ ; a^2 = b^2({e_2}^2 - 1).$

(5) $The\ position\ of\ a\ point\ P(x_1, y_1)\ w.r.t.the\ hyperbola\ \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

$If\ \frac{{x_1}^2}{a^2} - \frac{{y_1}^2}{b^2} - 1 > 0$, $then\ inside\ the\ hyperbola$

$= 0$, $then\ on\ the\ hyperbola$

< 0 , $then\ outside\ the\ hyperbola$

(6) $The\ equation\ of\ tangent\ of\ the\ hyperbola\ \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1\ at\ P(x_1, y_1)\ is$

$\frac{xx_1}{a^2} - \frac{yy_1}{b^2} = 1.$

(7) $The\ equation\ of\ normal\ of\ the\ hyperbola\ \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1\ at\ P(x_1, y_1)\ is$

$b^2x_1(y - y_1) + a^2y_1(x - x_1) = 0.$

Classification of Curves:-

$Let\ us\ consider\ a\ second\ degree\ curve\ in\ x, y\ as$

$ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0 \ldots (i)$ $[at\ least\ one\ of\ a, h, b\ is\ non - zero\ constant]$

$$\Delta = \begin{vmatrix} a & h & g \\ h & b & f \\ g & f & c \end{vmatrix} = abc + 2fgh - af^2 - bg^2 - ch^2$$

Identification of Curves:-

$The\ above\ equation\ (i)\ represents$

$(i)\ A\ parabola\ if\ \Delta \neq 0\ \ \&\ \ h^2 = ab.$

$(ii)\ An\ ellipse\ if\ \Delta \neq 0\ \ \&\ \ h^2 < ab.$

$(iii)\ A\ hyperbola\ if\ \Delta \neq 0\ \ \&\ \ h^2 > ab.$

$(iv)\ A\ pair\ of\ straight\ lines\ if\ \Delta = 0\ \ \&\ \ h^2 \geq ab.$

$(v)\ A\ unique\ point\ if\ \Delta = 0\ \ \&\ \ h^2 < ab.$