Plane Geometry
Pair of straight lines
show that the equation $b x^{2}-2 h x y+a y^{2}=0$ represents a pair of straight lines which are at right angles to the pair given by $a x^{2}+2 h x y+b y^{2}=0$
Sol. Given el is $a x^{2}+2 h x y+b y_{=0}^{2}$
Let eq (1) represents $y=m_{1} x$ (i) and $y=m_{2} x$

$$
\begin{align*}
& m_{1}+m_{2}=\frac{-2 h}{b}  \tag{10}\\
& m_{1} m_{2}=\frac{a}{b}
\end{align*}
$$

$$
\perp+1
$$

Now e? is lines 1 to (11) and (1) are

$$
\begin{aligned}
& y=\frac{-1}{m_{1}} x \\
& y=\frac{-1}{m_{2}} x
\end{aligned}
$$

$$
\begin{aligned}
& m_{1} y+x=0 \\
& m_{2} y+x=0
\end{aligned}
$$

foint eq. is

$$
\begin{gathered}
\left(m_{1} y+x\right)\left(m_{2} y+x\right)=0 \\
m_{1} m_{2} y^{2}+m_{1} x y+m_{2} x y+x^{2}=0 \\
m_{1} m_{2} y^{2}+\left(m_{1}+m_{2}\right) x y+x^{2}=0
\end{gathered}
$$

$$
\begin{aligned}
& \left(\frac{a}{b}\right) y^{2}+\left(\frac{-2 h}{b}\right) x y+x^{2}=0\left[\begin{array}{c}
\text { from (1) } \\
\text { and (1) }
\end{array}\right] \\
& a y^{2}-2 h x y+b x^{2}=0
\end{aligned}
$$

Which is the required el.
Hence Proved.

