Intersection of a Line and a Hyperbola.

The straight line $y = mx + c$ will cut the hyperbola $\dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 1$ in two points may be real, coincident or imaginary according as $c^2 >, =, < a^2m^2 - b^2$.

Condition of tangency: If straight line $y = mx + c$ touches the hyperbola $\dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 1$, then $c^2 = a^2m^2 - b^2$.