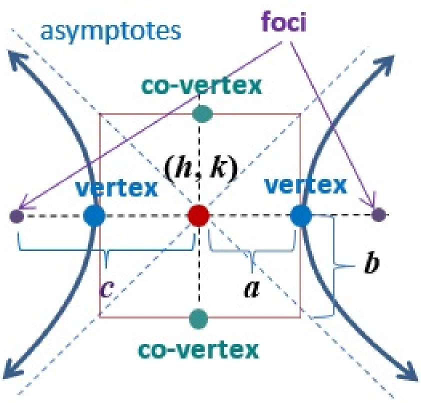
Concepts and Formulas

Conic Section

Vertical and Horizontal Hyperbola Difference

<table>
<tr><td>Horizontal Hyperbola
(x^2 comes first)</td><td>Vertical Hyperbola
(y^2 comes first)</td></tr>
<tr><td>At $(0,0)$: $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$
General: $\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$
$a^2 + b^2 = c^2$
Center: (h, k) Foci: $(h \pm c, k)$
Vertices: $(h \pm a, k)$ Co-Vertices: $(h, k \pm b)$
Length of Transverse Axis: $2a$
Length of Conjugate Axis: $2b$
Asymptotes: $y - k = \pm \frac{b}{a}(x-h)$

</td><td>At $(0,0)$: $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$:
General: $\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$
$a^2 + b^2 = c^2$
Center: (h, k) Foci: $(h, k \pm c)$
Vertices: $(h, k \pm a)$ Co-Vertices: $(h \pm b, k)$
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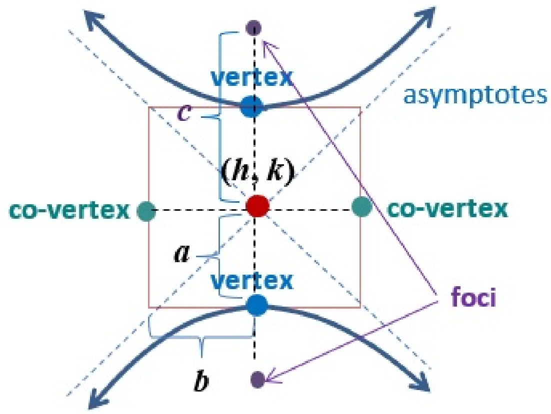
</td></tr>
<tr><td colspan="2">Notes: b^2 is always after the minus sign; $a^2 + b^2 = c^2$; Tranverse Axis Length: $= 2a$; Conjugate Axis Length $= 2b$; Asymptotes are $y - k = \pm \frac{\sqrt{\text{number under the } y}}{\sqrt{\text{number under the } x}}(x-h)$</td></tr>
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