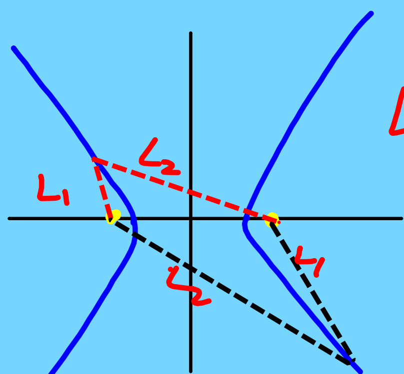
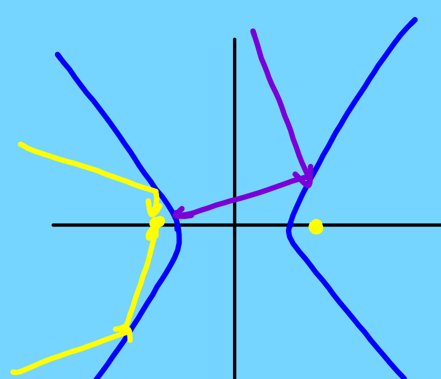
HYPERBOLAS

- the set of points in which the difference of the distances from 2 given points is constant



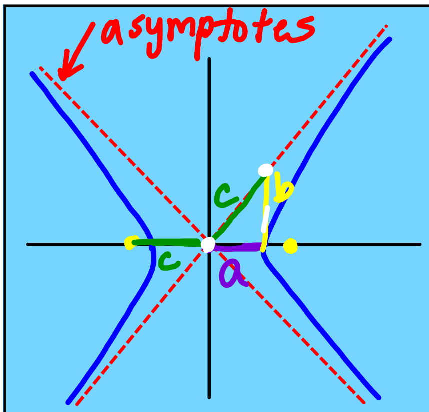
$L_2 - L_1 = \#$

Reflective Property



Applications

architecture
transmission gear
light from lamp shade
sonic boom
nuclear power plant towers
pringles chips



$$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$$

center: (h, k)

vertices: $(h \pm a, k)$

foci: $(h \pm c, k)$

slopes of asymptotes: $\pm \frac{b}{a}$

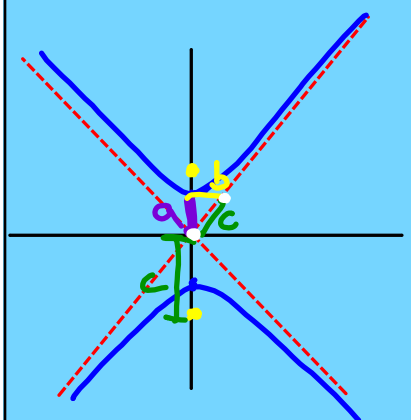
a = center to vertex

b = vertex to asymptote

c = center to focus

$c^2 = a^2 + b^2$

a is 1st number



$$\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$$

center: (h, k)

vertices: $(h, k \pm a)$

foci: $(h, k \pm c)$

slopes: $\pm \frac{a}{b}$

$25y^2 - 16x^2 - 150y - 32x - 191 = 0$

$25y^2 - 150y \_\_ - 16x^2 - 32x \_\_ = 191$

$25(y^2 - 6y + 9) - 16(x^2 + 2x + 1) = 191 + 225 - 16$

-3 $\quad +1$

$+225$ $\quad -16$

$$\frac{\cancel{25}(y-3)^2}{\cancel{400}\ 16} - \frac{\cancel{16}(x+1)^2}{\cancel{400}\ 25} = \frac{400}{400}$$

$$\frac{(y-3)^2}{16} - \frac{(x+1)^2}{25} = 1$$

Center: $(-1, 3)$

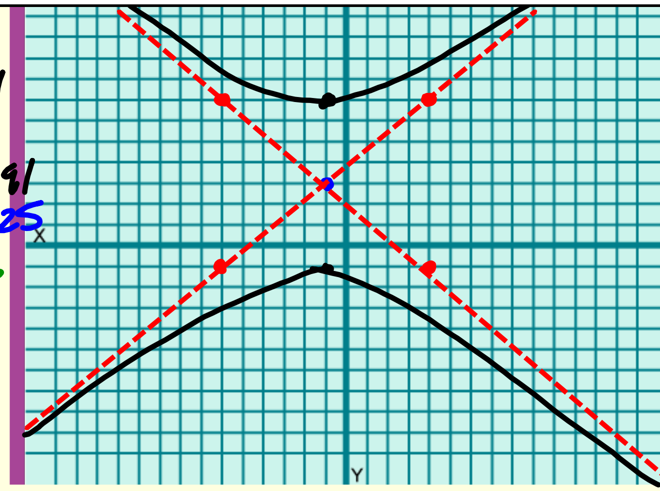
$a = \sqrt{16} = 4$ $\quad$ Slopes: $\pm\frac{4}{5}$

$b = \sqrt{25} = 5$

Vertical

Vertices $(-1, 3 \pm 4) < \begin{matrix}(-1, 7) \\ (-1, -1)\end{matrix}$

Foci (



To graph:
1) Plot center
2) Plot asymptotes
3) Plot vertices
4) Draw curves toward asymptotes

$c^2 = a^2 + b^2$

$c^2 = 16 + 25$

$\sqrt{c^2} = \sqrt{41}$