$y - y_1 = m(x - x_1)$

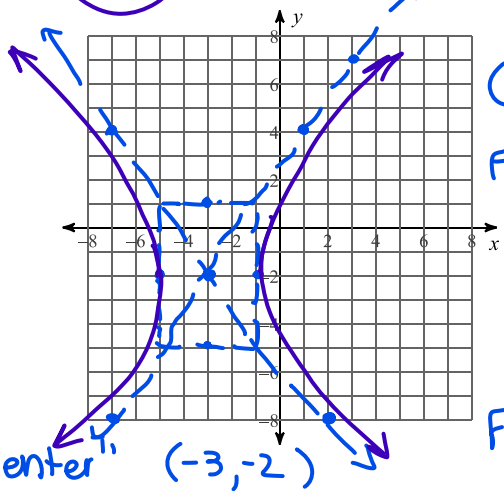
Pre Calculus Name_____

Conic Sections Hyperbolas Notes

Date_____ Period____

Identify the vertices, foci, and asymptotes of each. Then sketch the graph.

1) $\frac{(x+3)^2}{4} - \frac{(y+2)^2}{9} = 1$



Vertices $(-1,-2)$ and $(-5,-2)$

Focal length

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

$c^2 = 4 + 9$

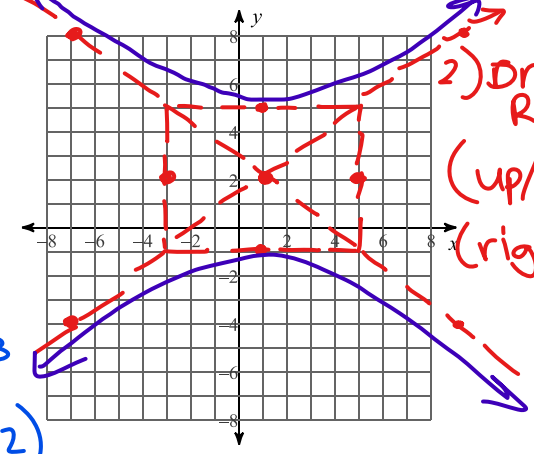
$c^2 = 13 \quad c = \sqrt{13}$

Foci $(-3 \pm \sqrt{13}, -2)$

"center" $(-3,-2)$

asymptotes $y + 2 = \pm\frac{3}{2}(x+3)$

2) $\frac{(y-2)^2}{9} - \frac{(x-1)^2}{16} = 1$



1) "center" $(1,2)$

2) Draw Rectangle

(up/down 3)

(right/left 4)

vertices $(1,5)$ $(1,-1)$

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

$c^2 = 9 + 16 = 25$

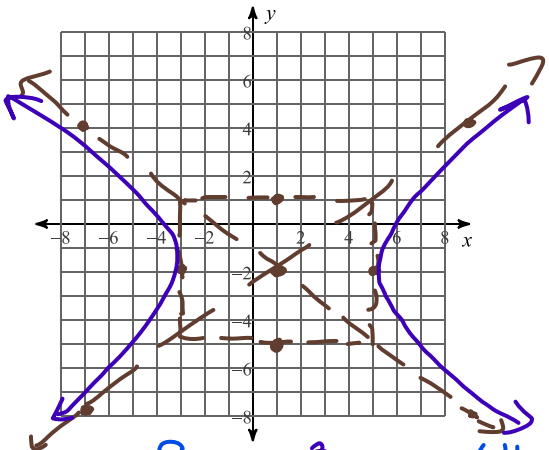
$c = 5$

Foci $(1, 2 \pm 5)$

$(1,7), (1,-3)$

Asymptotes $y - 2 = \pm\frac{3}{4}(x-1)$

3) $9x^2 - 16y^2 - 18x - 64y - 199 = 0$



$9x^2 - 18x \underline{+9} - 16y^2 - 64y \underline{-64} = 199 + 9 - 64$

$9(x^2 - 2x \underline{+1}) - 16(y^2 + 4y \underline{+4})$

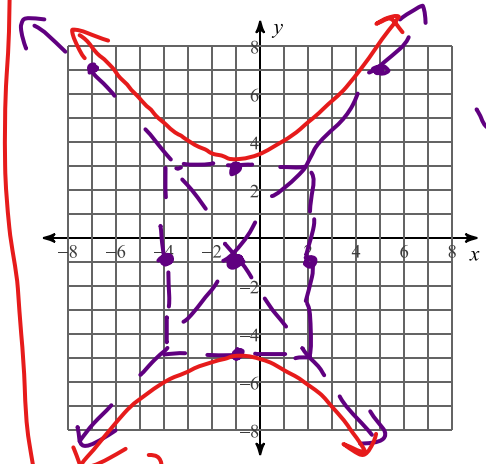
$\frac{9(x-1)^2}{144} - \frac{16(y+2)^2}{144} = \frac{144}{144}$

$$\frac{(x-1)^2}{16} - \frac{(y+2)^2}{9} = 1$$

Center $(1, -2)$

up/down 3 L/R 4

4) $-16x^2 + 9y^2 - 32x + 18y - 151 = 0$



c: $(-1, 1)$

up/down 4

L/R 3

$-16x^2 - 32x \underline{-16} + 9y^2 + 18y \underline{+9} = 151 \underline{+9} \underline{-16}$

$-16(x^2 + 2x \underline{+1}) + 9(y^2 + 2y \underline{+1})$

$\frac{-16(x+1)^2}{144} + \frac{9(y+1)^2}{144} = \frac{144}{144}$

$$-\frac{(x+1)^2}{9} + \frac{(y+1)^2}{16} = 1$$