Pre Calculus Name________________________________

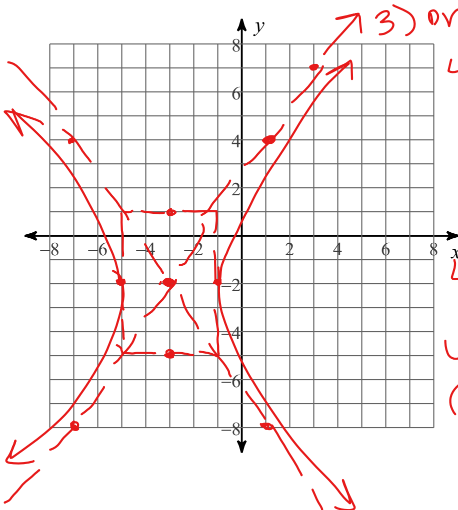
Conic Sections Hyperbolas Notes

Date________________ Period____

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

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

1) "center" $(-3,-2)$
2) Find x-y distances
3) Draw a rectangle
4) Draw the diagonals through the corners (asymptotes)
4) Figure out if the hyp opens up/down or L/R? (which one (x or y) > 0



1) vertices: $(-1,-2)$ $(-5,-2)$

2) $c^2=a^2+b^2 \rightarrow c^2=4+9=13 \rightarrow c=\sqrt{13}$

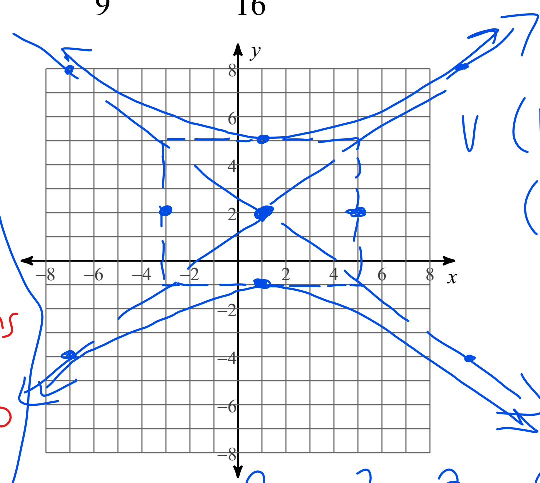
Foci: $(-3\pm\sqrt{13},-2)$

3.) $y-y_1=m(x-x_1) \rightarrow$ Point-slope form $(-3,-2)$

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

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

"center": $(1,2)$



V $(1,-1)$ $(1,5)$

$c^2=a^2+b^2=9+16=25$

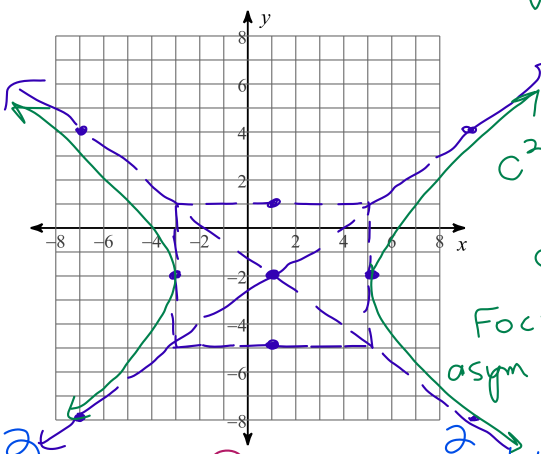
$c^2=25$ so $c=5$

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

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

Both squared and 1+ and 1 −

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



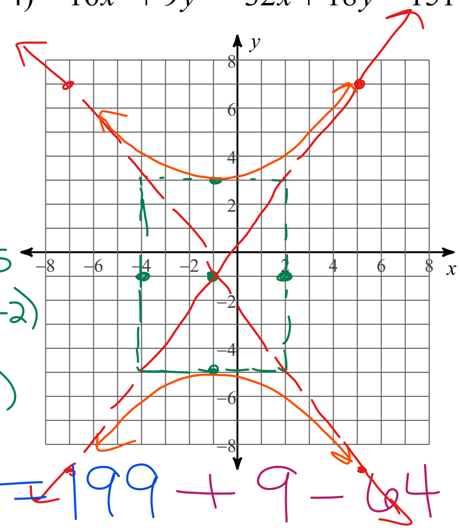
V $(-3,-2)$ $(5,-2)$

$c^2 = a^2 + b^2$
$= 16 + 9$
$c^2 = 25 \to c = 5$

Foci $(6,-2)$ $(-4,-2)$

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

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



$$9x^2 - 18x + 9 \quad -16y^2 - 64y - 64 = 199 + 9 - 64$$

$$9(x^2 - 2x + 1) - 16(y^2 + 4y + 4)$$

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

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

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

$$-16(x^2 + 2x + 1) + 9(y^2 + 2y + 1)$$

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

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

"center" $(-1,-1)$

$c^2 = 25$

asymp $y+1 = \pm\frac{4}{3}(x+1)$

$c = 5$

Foci: $(-1, 4)$ $(-1, -6)$

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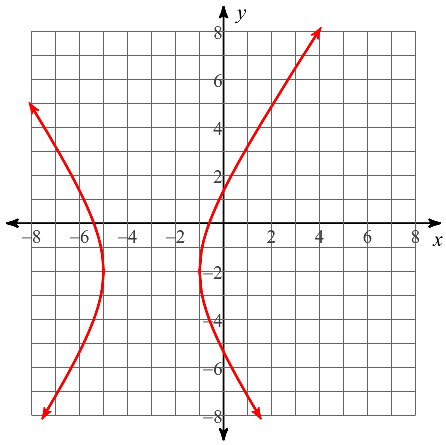
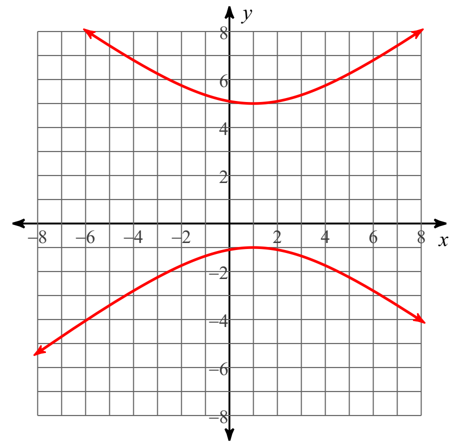
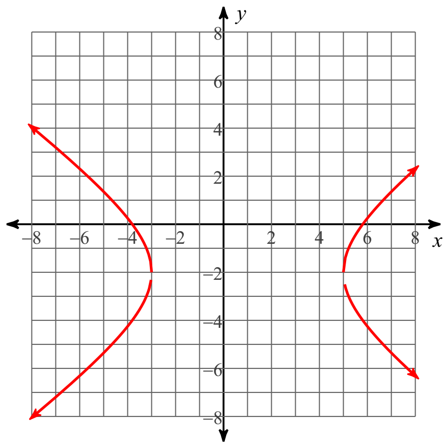
1) $\dfrac{(x+3)^2}{4} - \dfrac{(y+2)^2}{9} = 1$



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



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



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