Day 6 Notes KEY

Friday, April 24, 2015 9:42 AM

Precalculus
Conics – Hyperbolas – Day 2 Notes

Name: Key
Period:

Directions: Write an equation in standard form for each hyperbola. Use the graph to help you!

1. Foci at $(\pm 5, 0)$; endpoints of transverse axis $(\pm 3, 0)$ ← vertices

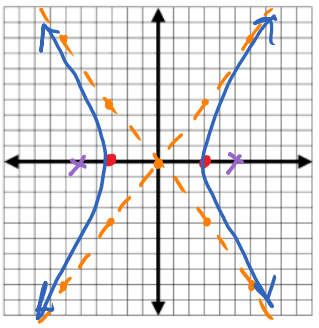
$F = \sqrt{a^2 + b^2}$
$5 = \sqrt{9 + b^2}$
$25 = 9 + b^2$
$16 = b^2$
$4 = b$

centered @ (0,0)

$a = 3$

$m = \pm \frac{4}{3}$

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



2. Endpoints of transverse axis at $(\pm 4, 0)$; Endpoints of conjugate axis at $(0, \pm 3)$

centered @ (0,0)

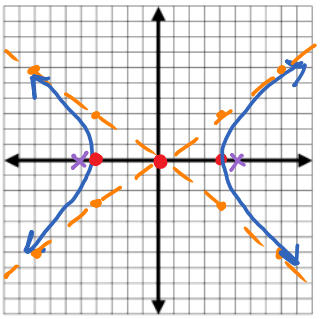
vertices! $a = 4$

$b = 3$

$F = \sqrt{4^2 + 3^2}$
$F = 5$

$m = \pm \frac{3}{4}$

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



3. The endpoints of the transverse axis are $(-2, -3)$ *and* $(-2, 7)$ and of the conjugate axis are $(-4, 2)$ *and* $(0, 2)$

parallel to y-axis! y ⊕

center ⇒ (-2,2)

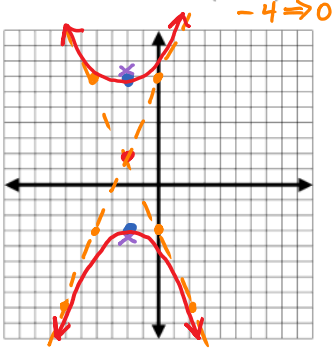
$b = 5$

$-4 \Rightarrow 0 = 4$ so $a = 2$

$F = \sqrt{2^2 + 5^2}$
$F = \sqrt{29}$

$m = \pm \frac{5}{2}$

$$\frac{(y-2)^2}{25} - \frac{(x+2)^2}{4} = 1$$



4. The transverse axis endpoints are $(-5, 2)$ *and* $(3, 2)$; the conjugate axis is length 6,

parallel to x-axis

x ⊕

center: (-1,2)

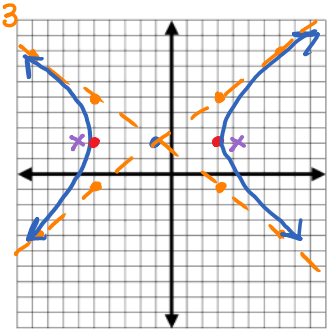
$a = 4$

$b = 3$

$F = \sqrt{4^2 + 3^2}$
$F = \sqrt{25} = 5$

$m = \pm \frac{3}{4}$

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



5. State the location of the center, the length of the semi-transverse and semi-conjugate axis, and write in parametric form: $\frac{x^2}{36}-\frac{y^2}{25}=1$

$x = 6\sec t$
$y = 5\tan t$

Center: $(0,0)$
Semi-transverse: 6
Semi-conjugate: 5

6. State the location of the center, the length of the semi-transverse and semi-conjugate axis, and write in parametric form: $\frac{(x-2)^2}{16}-\frac{(y+1)^2}{12}=1.$

$x = 4\sec t + 2$
$y = 2\sqrt{3}\tan t - 1$

Center: $(2,-1)$
Semi-transverse: 4
Semi-conjugate: $2\sqrt{3}$

7. Put the equation. $3x^2-5y^2-12x+30y+42=0$ into standard form by completing the square.

$(3x^2-12x)+(-5y^2+30y)=-42$
$3(x^2-4x+\underline{4})-5(y^2-6y+\underline{9})=-42+\underline{12}-\underline{45}$
$\frac{3(x-2)^2}{-75}-\frac{5(y-3)^2}{-75}=\frac{-75}{-75}$
$\frac{(x-2)^2}{-25}+\frac{(y-3)^2}{15}=1 \Rightarrow \boxed{\frac{(y-3)^2}{15}-\frac{(x-2)^2}{25}=1}$

8. Put the equation. $4x^2-y^2-32x+16y-128=0$ into standard form by completing the square.

$(4x^2-32x)+(-y^2+16y)=128$
$4(x^2-8x+\underline{16})-(y^2-16y+\underline{64})=128+\underline{64}-\underline{64}$
$\frac{4(x-4)^2}{128}-\frac{(y-8)^2}{128}=\frac{128}{128}$
$\boxed{\frac{(x-4)^2}{32}-\frac{(y-8)^2}{128}=1}$