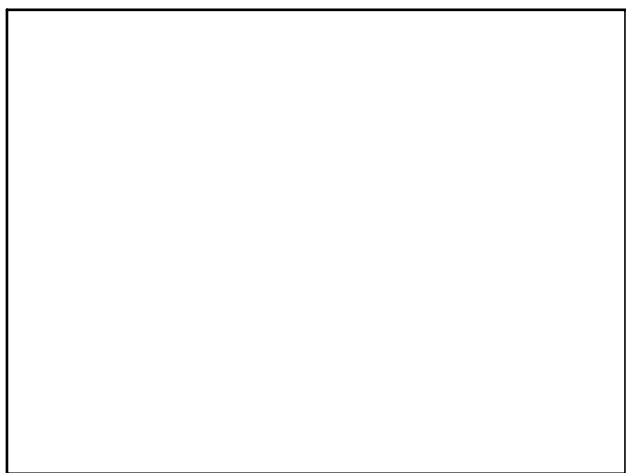Conic II: Hyperbolas

EQ: How are the characteristics of an hyperbola derived from an equation?

Aug 30-6:53 AM

Sep 7-9:54 AM

Keep in mind....

Major axis ➡ Transverse axis
Minor axis ➡ Conjugate axis

If it looks like this: $\dfrac{(y-k)^2}{a^2} - \dfrac{(x-h)^2}{b^2} = 1$ = vertical

If it looks like this: $\dfrac{(x-h)^2}{a^2} - \dfrac{(y-k)^2}{b^2} = 1$ = horizontal

E

?

Aug 31-8:40 AM

Let's practice: Find the vertices and foci.....

$$\frac{(x-5)^2}{49} - \frac{(y-2)^2}{36} = 1$$

Center: $(5,2)$
Vert. : $(5\pm7, 2) = (12,2)(-2,2)$
$a^2 + b^2 = c^2$ foci : $(5\pm\sqrt{85}, 2)$
    $c^2 = 85$
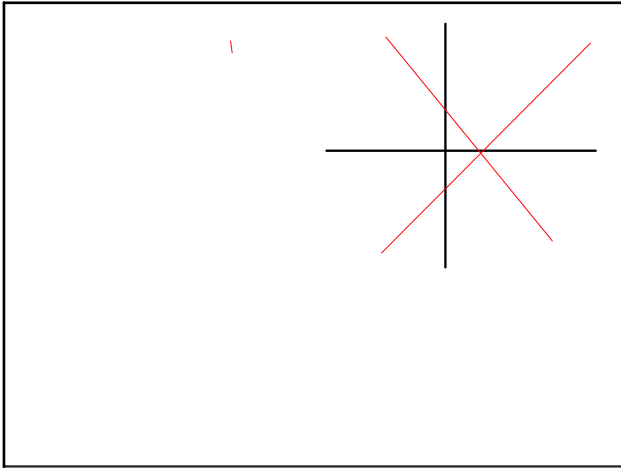 $c = \sqrt{85}$ $49 + 36 = c^2$
           $85 = c^2$

Feb 11-8:55 PM

Let's practice: Find the vertices and foci.....

$$\frac{(y-1)^2}{\underset{a^2}{④}} - \frac{x^2}{1} = 1$$

Center: $(0,1)$
Vertices: $(0, 1\pm2) = (0,3)(0,-1)$
Loci : $2^2 + 1^2 = c^2$ $(0, 1\pm\sqrt{5})$
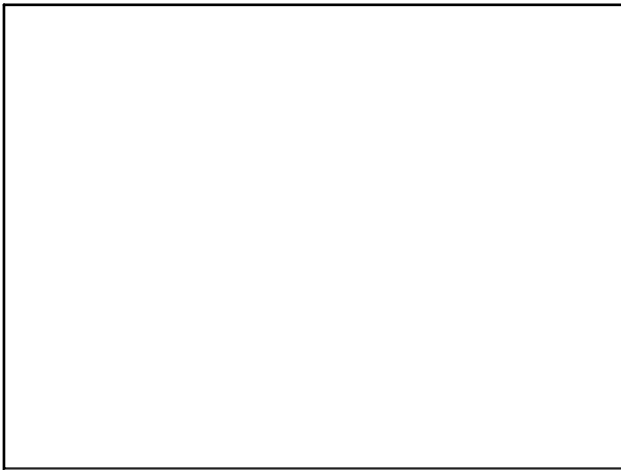 $5 = c^2$
        $c = \sqrt{5}$

Feb 11-8:55 PM

Feb 12-11:24 AM

Let's practice: Find the vertices and foci.....

Feb 11-8:57 PM

Feb 11-8:57 PM

Let's practice: Find the vertices and foci.....

$-4x^2 + 3y^2 + 72x - 18y = 321$

$3y^2 - 4x^2 + 72x - 18y = 321$

$3y^2 - 18y - 4x^2 + 72x = 321$

$3(y^2 - 6y + 9) - 4(x^2 - 18x + 81) = 321 + 27 \underline{-324}$

$c = (-6/2)^2 = 9 \qquad c = (-18/2)^2 = 81(4)$

$\dfrac{3(y-3)^2}{24} - \dfrac{4(x-9)^2}{24} = \dfrac{24}{24}$

$\dfrac{(y-3)^2}{8} - \dfrac{(x-9)^2}{6} = 1$

Center : $(9, 3)$

vert : $(9, 3 \pm \sqrt{8})$

foci : $(9, 3 \pm \sqrt{14})$

$\sqrt{8}^2 + \sqrt{6}^2 = c^2$

$8 + 6 = c^2$

$14 = c^2 \quad c = \sqrt{14}$

PRACTICE: IDENTIFY CHARACTERISTICS AND GRAPH

1. $\dfrac{(x+5)^2}{9} - \dfrac{(y-8)^2}{25} = 1$

2. $\dfrac{(x+1)^2}{121} - \dfrac{(y-6)^2}{36} = 1$

3. $\dfrac{(x+2)^2}{16} - \dfrac{(y+9)^2}{121} = 1$

4. $\dfrac{x^2}{49} - \dfrac{(y-6)^2}{64} = 1$

5. $\dfrac{(x-6)^2}{169} - \dfrac{(y+3)^2}{100} = 1$

6. $-x^2 + 9y^2 - 2x - 18y - 73 = 0$

7. $x^2 - y^2 + 8x + 8y - 81 = 0$

Write equation in standard form of hyperbola
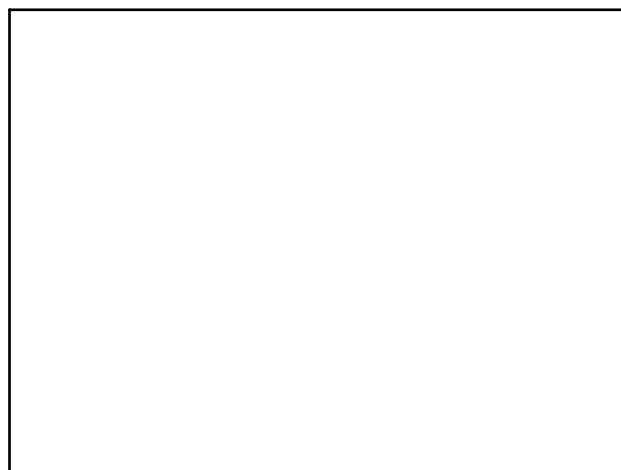
$25x^2 - 16y^2 + 100x + 96y = 444$

Aug 31-8:48 AM

Ex. 2 Write equation in standard form of hyperbola

$-4x^2 + 3y^2 + 72x - 18y = 321$

Aug 31-8:48 AM

Sep 5-9:12 AM

Ex. 3 Write equation in standard form of hyperbola and identify the center, vertices, and foci.

$9y^2 - 4x^2 + 8x + 18y + 41 = 0$

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

$V: (-5, 8)(-15, 8)$　　　Equati

$Foci: (-7, 8)(-13, 8)$

Aug 31-8:48 AM

Ex. 4 Write equation in standard form of hyperbola using:

Foci - (-3,0), (3, 0)

Vertices - (-2,0), (2, 0)

Aug 31-8:51 AM

Ex. 5 Write equation in standard form of hyperbola using:

Foci - (0,17), (0,-9)

Vertices - (0,16), (0,-8)

Aug 31-8:51 AM

Ex. 6 Write equation in standard form of hyperbola using:

Vertices - (-5,16), (-5, 4)

Conjugate axis is 18 units long

Sep 3-1:26 AM

Ex. 7 Write equation in standard form of hyperbola using:

Vertices - (-10,5), (-10, -17)
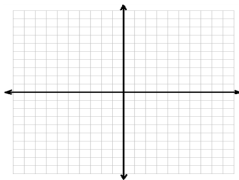
Conjugate axis is 10 units long

Sep 3-1:26 AM

Write equations in standard form of hyperbola using:

1. Foci - (0,4), (0, -4)   2. Foci - (0, 17), (0, -9)
   Vertices - (0,2), (0, -2)   Vertices (0, 16), (0, -8)

3. Vertices (2, 6), (-18, 6)
    Conjugate axis is 4 units long

4. Vertices (-10, 5), (-10, -17)
    Conjugate axis is 10 units long

Sep 3-1:27 AM

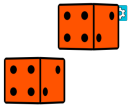Last thing......let's graph:
$$\frac{x^2}{4} - \frac{y^2}{16} = 1$$

Find: a. points on transverse axis (Vert.
        b. points on conjugate axis (co-vert.)

Sep 3-1:32 AM

Take a chance......

1 - thing in common
2 - things that is different between ellipse and hyperbola (not the shape)
3 - characteristics
4 - items needed to graph an ......
5 - Solve

Sep 3-1:38 AM