Lesson 88 Objective: SWBAT graph hyperbolas and find key features

Kickoff

Complete questions 15 and 16 on homework packet!

④ $\frac{(x+2)^2}{46} + \frac{(y-7)^2}{25} = 1$

⑤ $\frac{(x+8)^2}{64} + \frac{(y-7)^2}{81} = 1$

④ $(-2 \pm \sqrt{21}, 7)$ Minor length 10

$(2.6, 7)$ $(-6.6, 7)$

horizontal

Center $(-2, 7)$

$a = ?$

$b = 5$

$c = \sqrt{21}$

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

$25 + 21$

$a^2 = 46$

$\frac{(x+2)}{46} + \frac{(y-7)}{25} = 1$

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15) $16x^2 + 49y^2 - 64x + 392y + 64 = 0$

16) $4x^2 + y^2 - 64x + 20y + 320 = 0$

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Hyperbolas

A **hyperbola** looks sort of like two mirrored parabolas, with the two "halves" being called "branches".
Like an **ellipse**, a hyperbola has two foci and two vertices
**Unlike an ellipse,**

- The foci in a hyperbola are further from the hyperbola's center than are its vertices

branch branch

branch branch

Equations of a Hyperbola

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

Asymptote Equation: $y - k = \pm\frac{b}{a}(x-h)$

Transverses Vertical Axis: $\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} =$

Asymptote Equation: $y - k = \pm\frac{a}{b}(x-h)$

must = 1

* $a^2$ is always under the positive
* $b^2$ is always under the function negative function

Center $(h, k)$

$a$ = center → vertex * $b$ = center → edge of box

-Asymptotes go from corner to corner on the box and create the two branches.

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Graph the Hyperbola

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

horizontal

C (1, -2)

a = 2

b = 3

2) $4(y+3)^2 - 16(x+5)^2 = 64$

$\frac{(y+3)^2}{16} - \frac{(x+5)^2}{4} = 1$

vertical

C (-5, -3)

a = 4

b = 2

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

$(y+3) = \pm 2(x+5)$

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