

Objective 89 Lesson- SWBAT write equations of a hyperbola.

Kickoff

-Complete your participation rubric and place it on the desk!

-Complete questions 3 and 7 in your homework packet!

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

Vertical
 $C(1,1)$
 $a=3$
 $b=4$

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

Foci
 $(1, 10)$ $(1, -6)$

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7) $9(y-4)^2 - (x+4)^2 = 225$

$\frac{(y-4)^2}{25} - \frac{(x+4)^2}{225} = 1$

Vertical
 $C(-4,4)$
 $a=5$
 $b=15$

$a^2 + b^2 = c^2$
 $25 + 225 = c^2$
 $\sqrt{250} = c$
 $5\sqrt{10} = c$

Foci
 $(-4, 4 + 5\sqrt{10})$
 $(-4, 4 - 5\sqrt{10})$

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Hyperbolas Day 2

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

To write the equation of a hyperbola you need to find:
 - The center.
 - The a and b values.
 - If the hyperbola is horizontal or vertical.

Examples:
 1) Vertices: $(5, -8)$ & $(-3, -8)$
 Foci: $(7, -8)$ & $(-5, -8)$

horizontal
 $C(1, -8)$
 $a=4$
 $b=?$
 $c=6$

$a^2 + b^2 = c^2$
 $16 + b^2 = 36$
 $b^2 = 20$

$\frac{(x-1)^2}{16} - \frac{(y+8)^2}{20} = 1$

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2) Vertices: $(-5, 13)$ & $(-5, 7)$
 Foci: $(-5, 10 + \sqrt{58})$ & $(-5, 10 - \sqrt{58})$

Vertical
 $C(-5, 10)$
 $a=3$
 $b=?$
 $c=\sqrt{58}$

$a^2 + b^2 = c^2$
 $9 + b^2 = 58$
 $b^2 = 49$

$\frac{(y-10)^2}{9} - \frac{(x+5)^2}{49} = 1$

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3) Find the equation of the hyperbola in standard form. State if the hyperbola is vertical or horizontal.
 $4x^2 - 9y^2 - 48x + 72y + 144 = 0$

$4(x^2 - 12x) - 9(y^2 - 8y) = -144$
 $4(x^2 - 12x + 36) - 9(y^2 - 8y + 16) = -144 + 144 + 144$
 $4(x-6)^2 - 9(y-4)^2 = -144$
 $\frac{4(x-6)^2}{-144} + \frac{-9(y-4)^2}{-144} = \frac{-144}{-144}$
 $\frac{(x-6)^2}{-36} + \frac{(y-4)^2}{16} = 1$
 $\frac{(y-4)^2}{16} - \frac{(x-6)^2}{36} = 1$
 Vertical

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Complete all odds!!

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