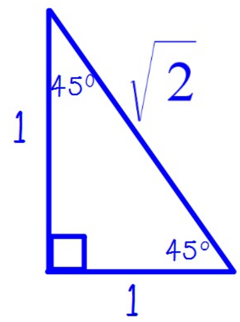
Spiral Review:

1. Use the triangle to the right.

a.) sin 45^0 $\frac{O}{H} = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

b.) cos 45^0 $\frac{A}{H} = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

c.) tan 45^0 $\frac{O}{A} = \frac{1}{1} = 1$



p.656 9.3 Hyperbolas (Day 2)

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

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

foci: $(h \pm c, k)$

vertices: $(h \pm a, k)$

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

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

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

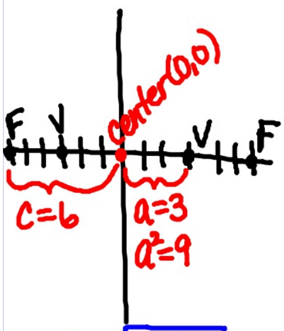
foci: $(h, k \pm c)$

vertices: $(h, k \pm a)$

Students will be able to find the standard form of a hyperbola with the given characteristics.

Example 1: Find the standard form of the hyperbola with the given characteristics.

a.) vertices: $(\pm 3,0)$
foci: $(\pm 6,0)$



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

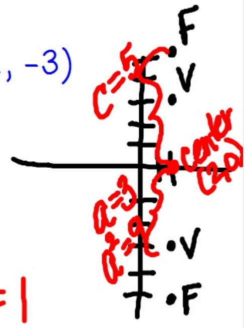
$$\frac{(x-0)^2}{9}-\frac{(y-0)^2}{27}=1$$

or

$$\boxed{\frac{x^2}{9}-\frac{y^2}{27}=1}$$

$$c=\sqrt{a^2+b^2}$$
$$(6)^2=\left(\sqrt{9+b^2}\right)^2$$
$$36=9+b^2$$
$$27=b^2$$

b.) vertices: $(2,3)$ $(2,-3)$
foci: $(2,5)$ $(2,-5)$



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

$$\frac{(y-0)^2}{9}-\frac{(x-2)^2}{16}=1$$

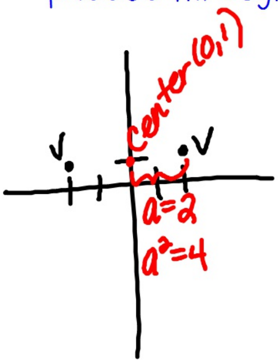
or

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

$$c=\sqrt{a^2+b^2}$$
$$(5)^2=\sqrt{9+b^2}^{\,2}$$
$$25=9+b^2$$
$$16=b^2$$

Students will be able to find the standard form of a hyperbola with the given characteristics.

c.) vertices: $(-2,1)$ $(2,1)$
passes through $(5,4)$



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

$$\frac{(x-0)^2}{4}-\frac{(y-1)^2}{b^2}=1$$

$$\boxed{\frac{x^2}{4}-\frac{(y-1)^2}{\frac{12}{7}}=1}$$

$$\frac{(5-0)^2}{4}-\frac{(4-1)^2}{b^2}=1$$

$$\frac{25}{4}-\frac{9}{b^2}=1$$
$$-\frac{25}{4}\qquad\qquad -\frac{25}{4}$$

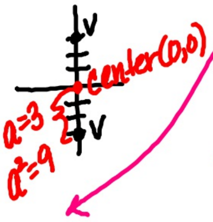
$$\frac{-9}{b^2}=\frac{-21}{4}$$

$$\frac{-21b^2}{-21}=\frac{-36}{-21}$$

$$b^2=\frac{12}{7}$$

Students will be able to find the standard form of a hyperbola with the given characteristics.

d.) vertices: $(0, \pm 3)$
asymptotes: $y = \pm 3x$



$\frac{a}{b} = 3$

$\frac{3}{b} = \frac{3}{1}$

$3b = 3$

$b = 1$

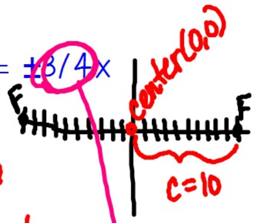
$b^2 = 1$

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

$\frac{(y-0)^2}{9} - \frac{(x-0)^2}{b^2} = 1$

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

e.) foci: $(\pm 10, 0)$
asymptotes: $y = \pm 3/4x$



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

$\boxed{\frac{(x-0)^2}{64} - \frac{(y-0)^2}{36} = 1}$

$\frac{b}{a} = \frac{3}{4}$

$\frac{3a}{3} = \frac{4b}{3}$

$a = \frac{4b}{3}$

$10 = \sqrt{\left(\frac{4b}{3}\right)^2 + b^2}$

$10 = \sqrt{\frac{16b^2}{9} + b^2}$

$(10)^2 = \left(\sqrt{\frac{25b^2}{9}}\right)^2$

$b^2 = 36 \leftarrow 100 = \frac{25b^2}{9}$

$\frac{6}{a} = \frac{3}{4}$

$3a = 24$

$a = 8$

$a^2 = 64$

Students will be able to classify the graph of the equation as a circle, parabola, ellipse, or a hyperbola.

Example 2: Students will be able to classify the graph of the equation as a circle, parabola, ellipse, or a hyperbola.

a.) $x^2 + y^2 - 4x - 6y - 23 = 0$

Circle

b.) $x^2 + 4x - 8y + 20 = 0$

parabola

c.) $4x^2 + 25y^2 + 16x + 250y + 541 = 0$

ellipse

Turn-in: ~~wkst-Conic Sections Tic-Tac-Toe~~
p. 665 (24, 36)

HW: p. 665 (11-19, 41, 43, 57-63 odds)