10) $(x-5)-(y+4)^2=0$

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

$4p=1$

$p=1/4$

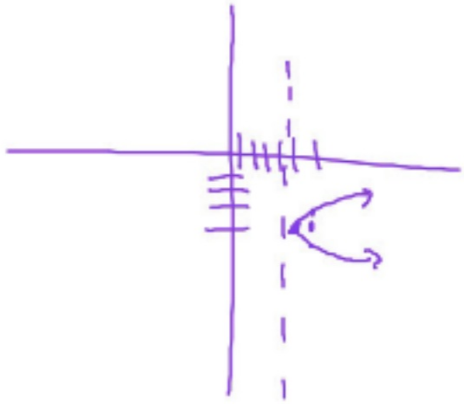
opens right

$V(5,-4)$

$F(5\tfrac{1}{4},-4)$

$LR=1$

dir: $x=4\,3/4$



Friday's Quiz:

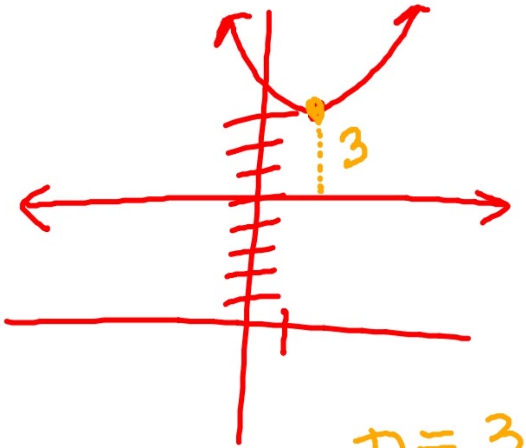
Circles
Parabolas
Distance formula
midpoint formula

15.) $V(1, 8)$

dir: $y=5$

$(x-h)^2 = 4p(y-k)$

$(x-1)^2 = 12(y-8)$



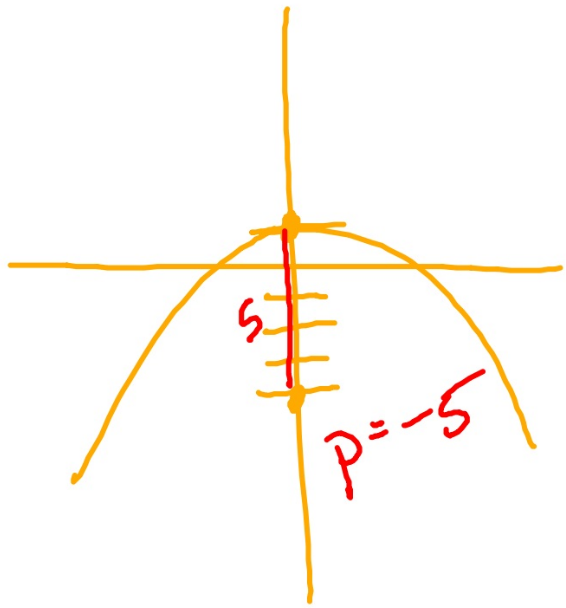
$p=3$

14.) $V(0, 1)$

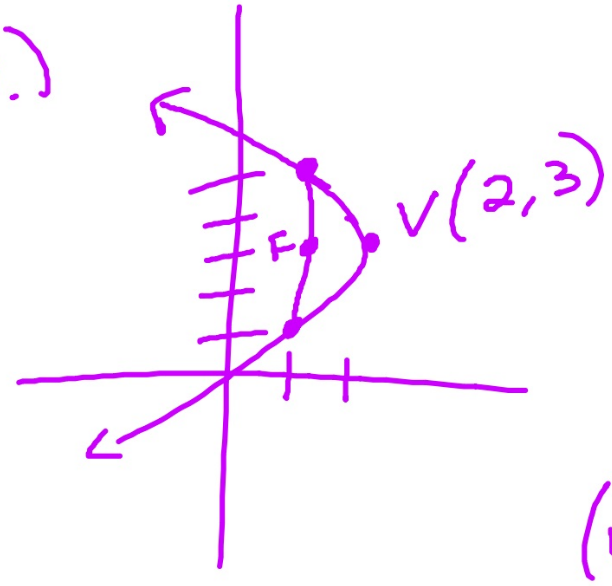
$F(0, -4)$

$$(x-\underset{0}{h})^2 = 4p(y-\underset{1}{k})$$

$$(x)^2 = -20(y-1)$$



17.)



$4p = -4$

$p = -1$

$(y-k)^2 = (4p)(x-h)$

$(y-3)^2 = -4(x-2)$

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

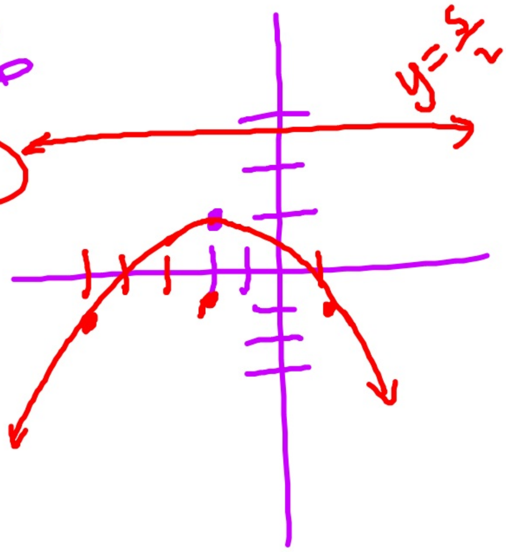
$4p=-6$

$p=-\frac{3}{2}$

$(x^2+4x+4)-4=-6y+2$

$(x+2)^2=-6y+6$

$(x+2)^2=-6(y-1)$



vertex $(-2,1)$

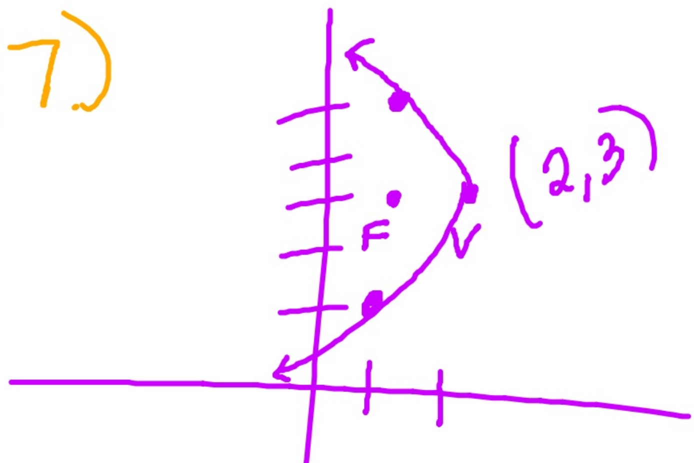
AOS: $x=-2$

focus $(-2,-\frac{1}{2})$

dir: $y=\frac{5}{2}$

17)

$LR = |4p|$



$LR = 4$

$4p = 4$

$p = -1$

$(y-k)^2 = 4(x-h)$

$(y-3)^2 = -4(x-2)$

7.) $(x-3)^2 = \underline{\underline{-4}}(y+2)$

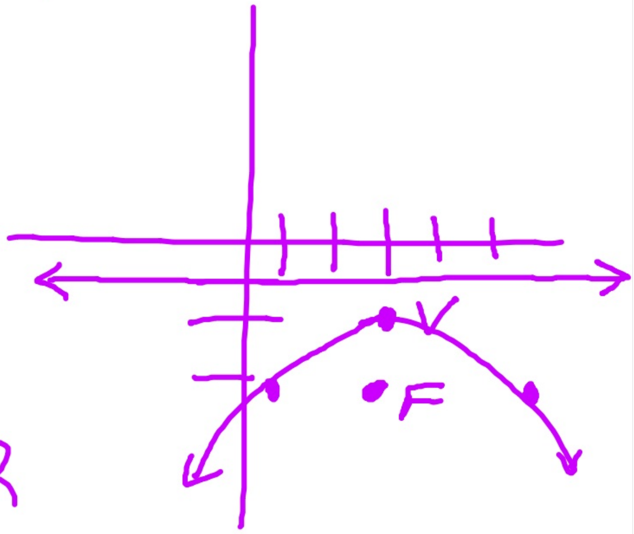
$V(3,-2)$

$F(3,-2)$

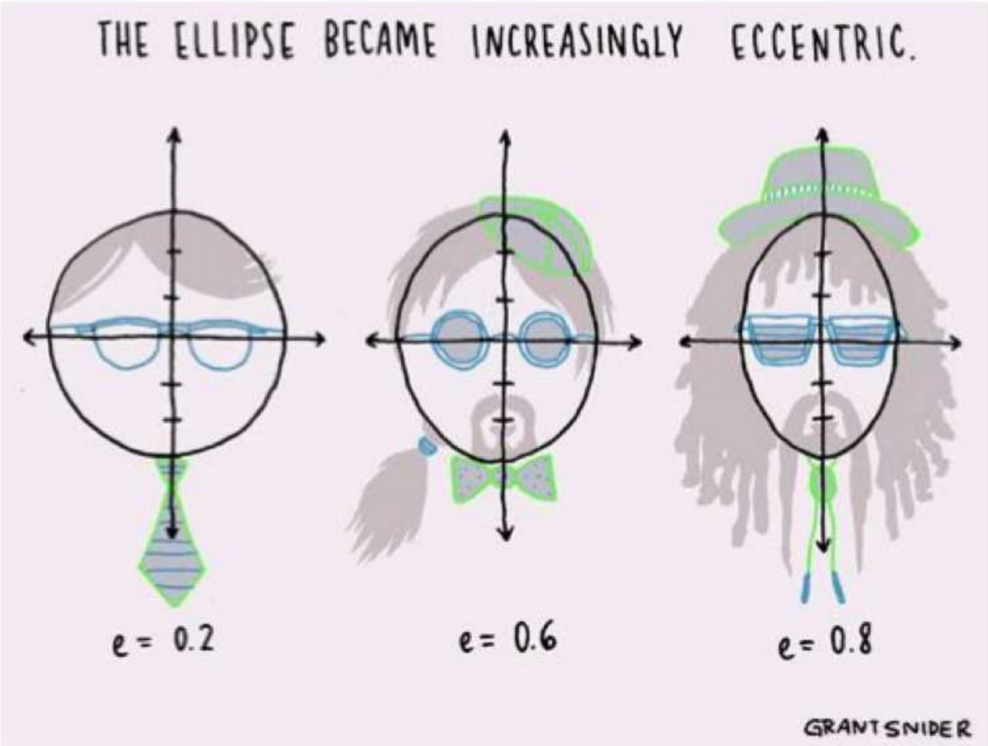
$4p=-4$ Dir: $y=-1$

$p=-1$

$|4p| = LR$

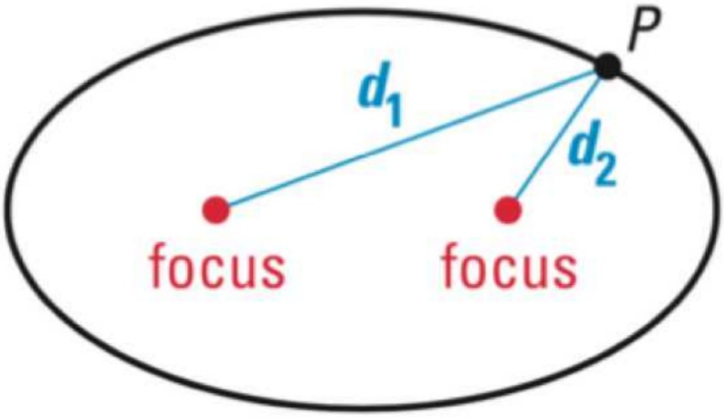


8.3 Ellipses, 8.4 Hyperbolas



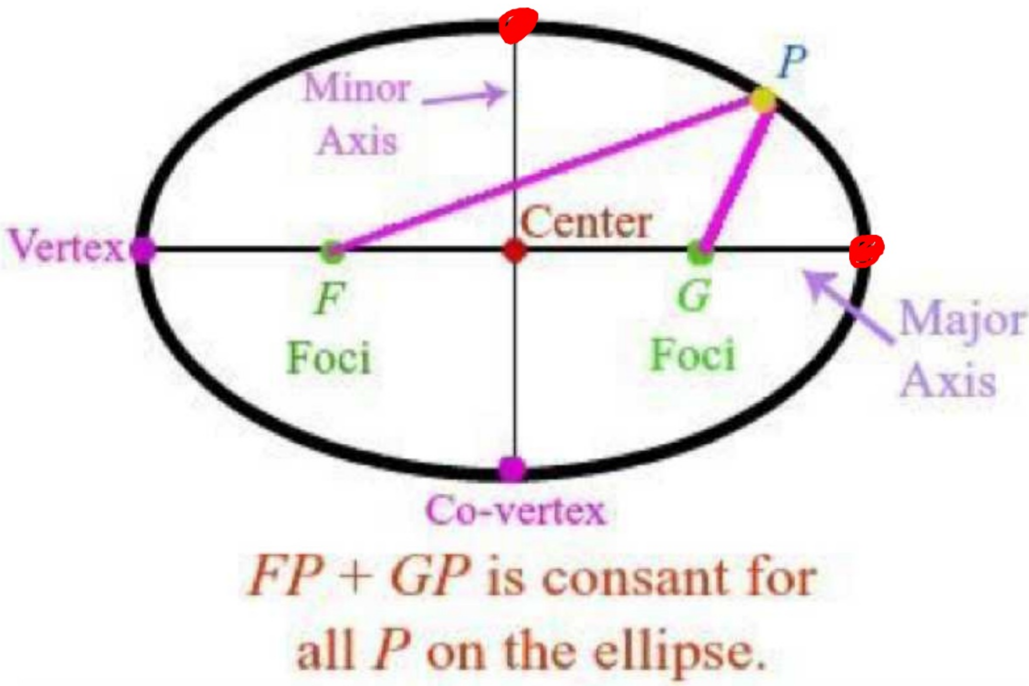
*See printout.

ellipse - locus of points P in a plane such that the sum of distances between P and two fixed points, called the foci, is constant



$d_1 + d_2 = \textbf{constant}$

Ellipse Vocabulary



Standard Form

Horizontal Ellipse

$$\frac{(x-h)^2}{\underset{25}{a^2}}+\frac{(y-k)^2}{\underset{16}{b^2}}=1$$

$a^2 > b^2$

Vertical Ellipse

$$\frac{(x-h)^2}{\underset{16}{b^2}}+\frac{(y-k)^2}{\underset{25}{a^2}}=1$$

$a^2 > b^2$

Where:

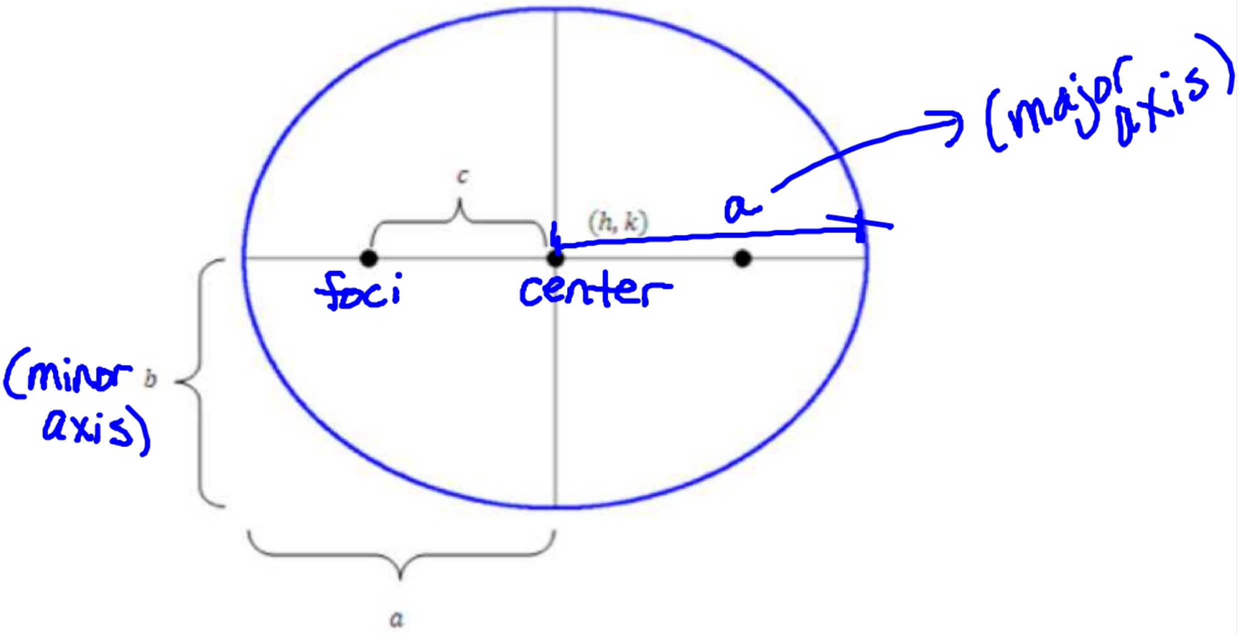
center: (h, k)

~~horizontal distance:~~

~~verical distance:~~

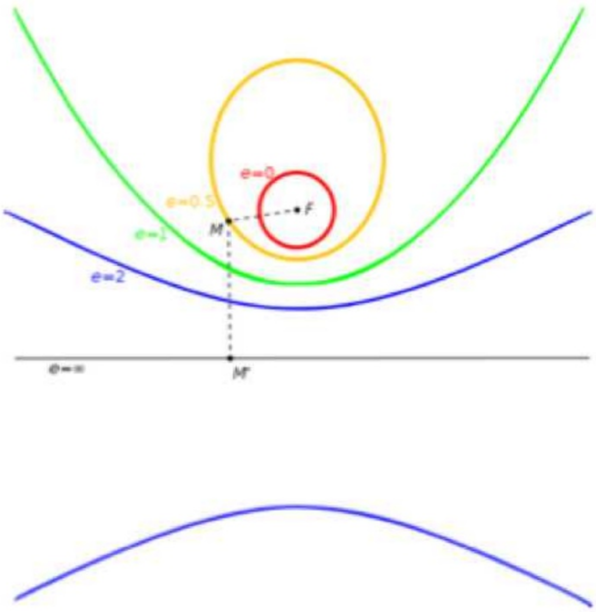
Foci - the foci of the ellipse lie on the major axis at a distance c units from the center

$$\boxed{c^2 = a^2 - b^2, \qquad a > b}$$



<u>Eccentricity</u> - a measure of how much the conic section deviates from being circular

$$\boxed{e = \left|\frac{c}{a}\right|}$$



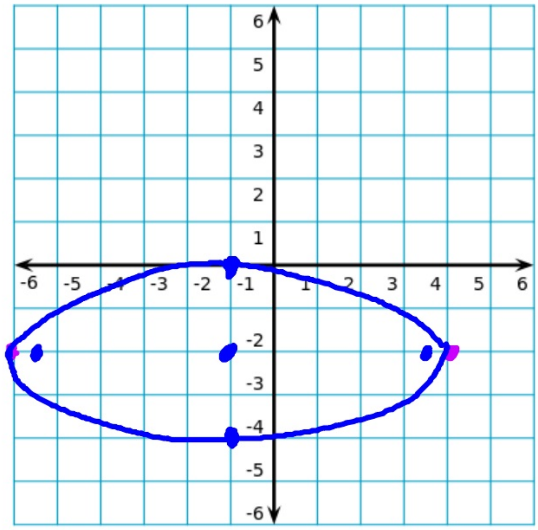
*The eccentricity of an ellipse is $0 < e < 1$.

ex: Sketch. State the center, foci, major axis length, minor axis length, vertices and eccentricity.

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

horiz.

Center	$(-1,-2)$
Foci	$(-1\pm\sqrt{21}, -2)$
Major Axis Length $2a$	10
Minor Axis Length $2b$	4
Vertices Covertices	$(4,-2)$ $(-6,-2)$ $(-1,0)$ $(-1,-4)$
Eccentricity	$\sqrt{21}/5$



$$c^2=a^2-b^2$$

$$c^2=25-4;\ c=\pm\sqrt{21}$$

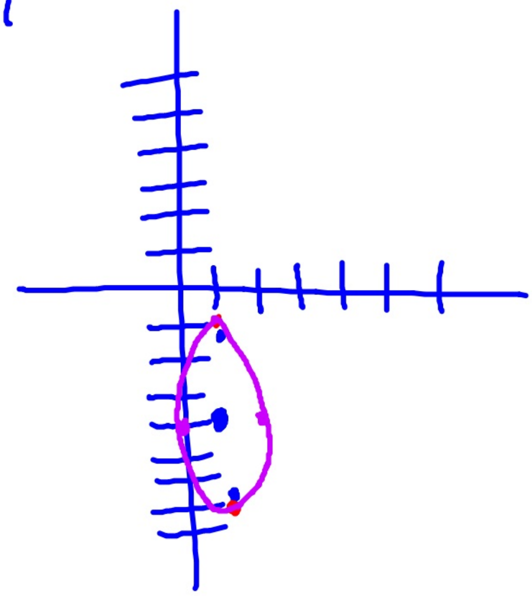
ex: Sketch. State the center, foci, major axis length, minor axis length, vertices and eccentricity.

$a = 3$
$b = 1$

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

$c^2 = 9 - 1$
$c = \pm\sqrt{8}$

Center	$(1, -4)$
Foci	$(1, -4 \pm \sqrt{8})$
Major Axis Length $a=3$	6
Minor Axis Length $b=1$	2
Vertices CV	$(1,-7)$ $(1,-1)$ $(0,-4)$ $(2,-4)$
Eccentricity	$\sqrt{8}/3$



ex: Rewrite in standard form.

a) $4x^2 + y^2 - 32x - 4y + 52 = 0$

$$4x^2 - 32x + y^2 - 4y = -52$$

$$\underbrace{4(x^2 - 8x + \underline{16})}\ \underline{-64} + \underbrace{y^2 - 4y + \underline{4}}\ \underline{-4} = -52$$

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

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

ex: Rewrite in standard form.

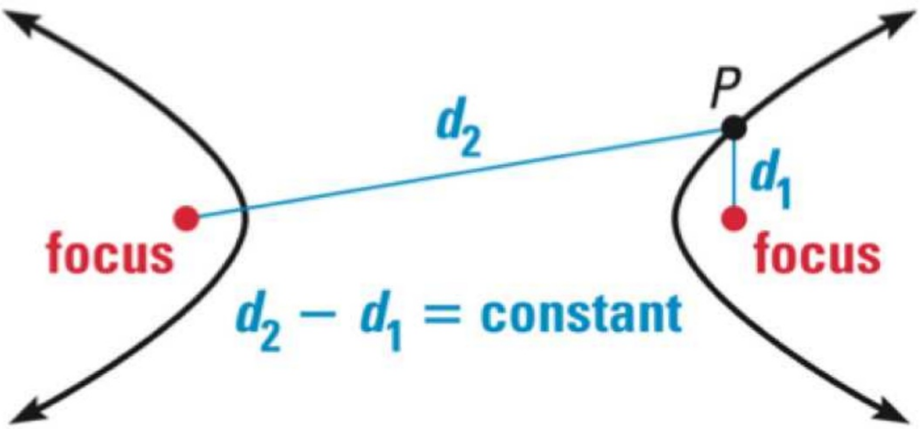
b) $\dfrac{4(x-10)^2}{12} + \dfrac{21(y+2)^2}{12} = \dfrac{12}{12}$

$$\frac{7}{4} = \frac{1}{\frac{4}{7}}$$

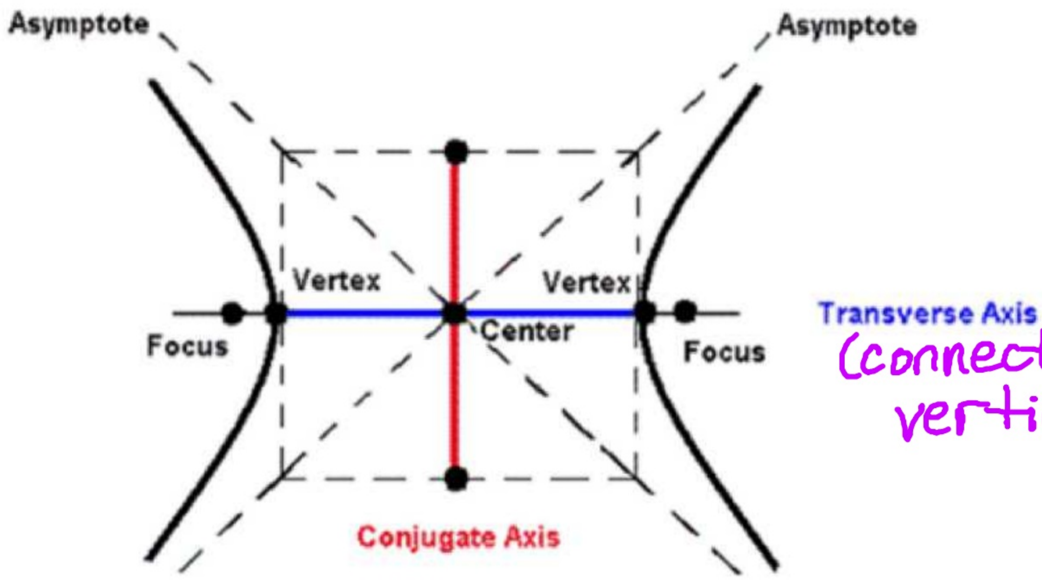
$$\frac{(x-10)^2}{3} + \frac{7(y+2)^2}{4} = 1$$

$$\frac{(x-10)^2}{3} + \frac{(y+2)^2}{4/7} = 1$$

hyperbola - locus of points P in a plane such that the difference of distances between P and two fixed points, called the foci, is constant



Hyperbola Vocabulary



(connect the vertices)

Standard Form

Opens Left & Right

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

Opens Up & Down

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

Where:

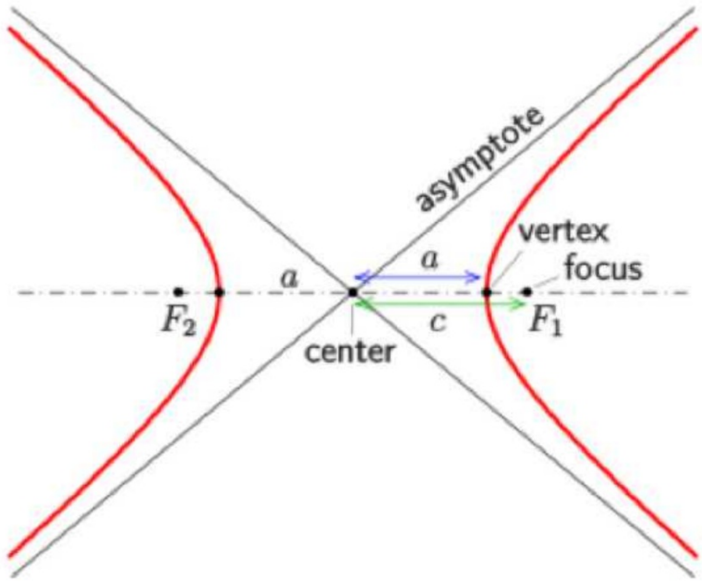
center: (h, k)

horizontal distance:__________

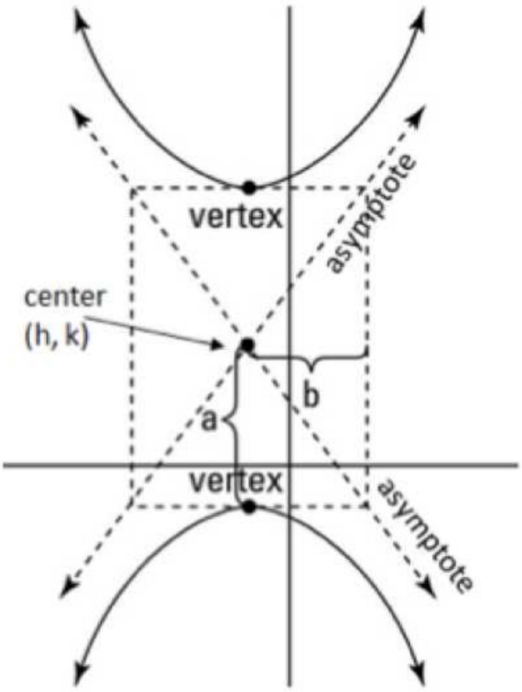
vertical distance:__________

Foci - the foci of the hyperbola lie on the transverse axis at a distance c units from the center

$$\boxed{c^2 = a^2 + b^2}$$



Asymptotes



Equations:

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

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

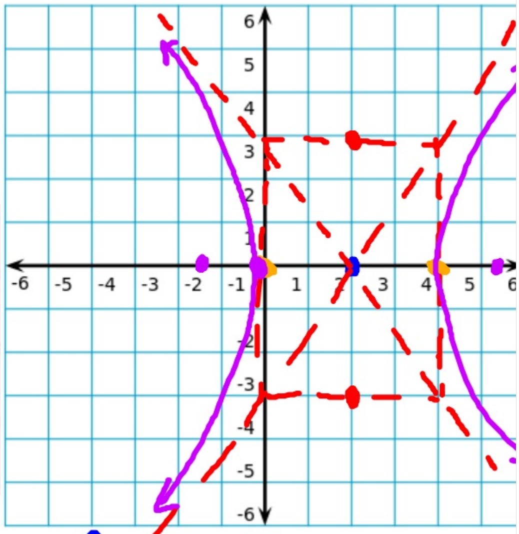
ex: Sketch. State the center, foci, vertices and asymptotes.

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

left/right

Center	$(2,0)$
Foci	$(2 \pm \sqrt{13}, 0)$
Vertices	$(0,0)$ $(4,0)$
Asymptotes	$y = \pm\frac{3}{2}(x-2)$

$a=2$ "a"



$y - y_1 = m(x - x_1)$

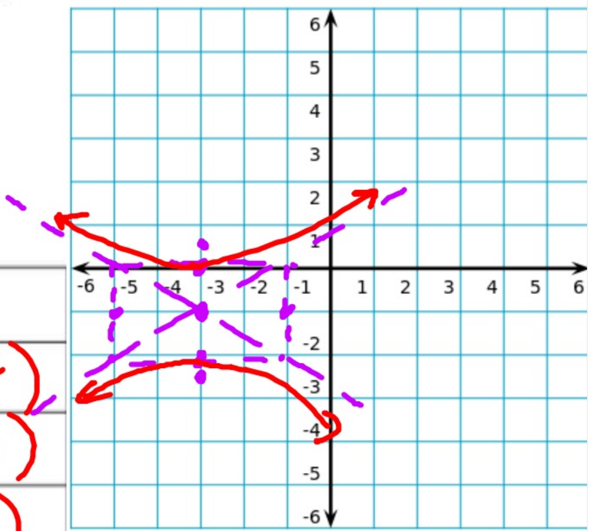
$y - 0 = \frac{\pm 3}{2}(x-2)$

$c^2 = 4 + 9$

$c = \pm\sqrt{13}$

ex: Sketch. State the center, foci, major axis length, minor axis length, vertices and eccentricity.

b) $(y+1)^2 - \dfrac{(x+3)^2}{4} = 1$



Center	$(-3, -1)$
Foci	$(-3, -1 \pm \sqrt{5})$
Vertices	$(-3, -2)$ $(-3, 0)$
Asymptotes	$y + 1 = \pm \frac{1}{2}(x - 3)$

ex: Rewrite in standard form.

$$4x^2 - 9y^2 - 16x + 18y - 65 = 0$$

$$4x^2 - 16x - 9y^2 + 18y = 65$$

$$4(x^2 - 4x + \underline{4}) \underline{-16} - 9(y^2 - 2y + \underline{1}) \underline{+9} = 65$$

$$\frac{4(x-2)^2}{72} - \frac{9(y-1)^2}{72} = \frac{72}{72}$$

$$\frac{(x-2)^2}{18} - \frac{(y-1)^2}{8} = 1$$