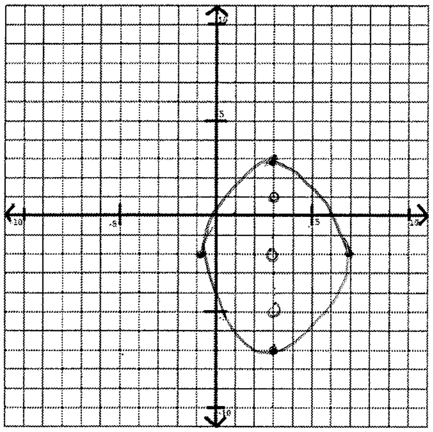
HONORS PRECALC Name Key

Ellipse/Hyperbola Quiz Review Period

I. Complete the information requested for each of the following graphs:

1. $\frac{(x-3)^2}{16}+\frac{(y+2)^2}{25}=1$ $c=\sqrt{25-16}=\sqrt{9}=3$



Center: $(3,-2)$

Vertices: $(3,3)$, $(3,-7)$

Co-vertices: $(-1,-2)$, $(7,-2)$

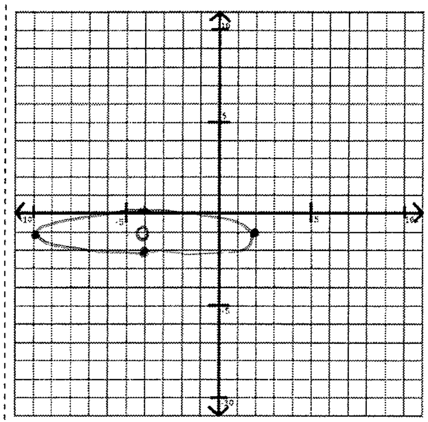
Foci: $(3,1)$, $(3,-5)$

Length of Major Axis: 10

Length of Minor Axis: 8

2. $\frac{(x+4)^2}{36}=-(y+1)^2+1$ $\frac{(x+4)^2}{36}+\frac{(y+1)^2}{1}=1$

$c=\sqrt{36-1}=\sqrt{35}$



Center $(-4,-1)$

Vertices: $(2,-1)$, $(-10,-1)$

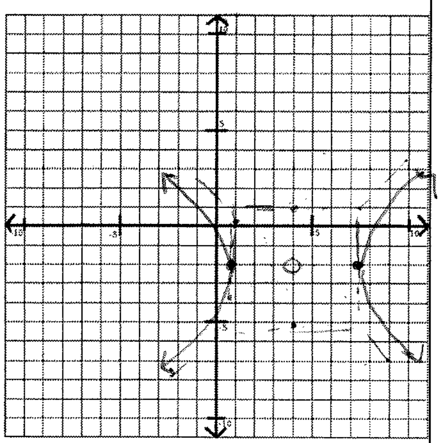
Co-vertices: $(-4,0)$, $(-4,-2)$

Foci: $(-4\pm\sqrt{35},-1)$

Length of Major Axis: 12

Length of Minor Axis: 2

3. $\frac{(x-4)^2}{12}-\frac{(y+2)^2}{9}=1$ $c=\sqrt{12+9}=\sqrt{21}$



Center: $(4,-2)$

Vertices: $(4+2\sqrt{3},-2)$, $(4-2\sqrt{3},-2)$

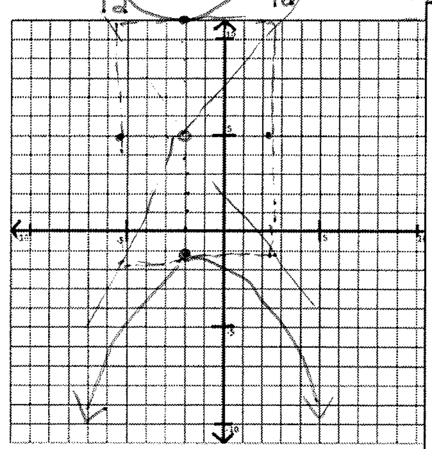
Length of Transverse Axis: $4\sqrt{3}$

Foci: $(4\pm\sqrt{21},-2)$

Equations of Asymptotes: $y+2=\pm\frac{\sqrt{3}}{2}(x-4)$

$\frac{3}{2\sqrt{3}}$ $\frac{3\sqrt{3}}{6}=\frac{\sqrt{3}}{2}$

4. $\frac{2(y-5)^2}{72}-\frac{4(x+2)^2}{72}=\frac{72}{72}$



Center: $(-2,5)$

Vertices: $(-2,11)$, $(-2,-1)$

Length of Transverse Axis: 12

Foci: $(-2,5\pm3\sqrt{6})$

Equations of Asymptotes: $y-5=\pm\sqrt{2}(x+2)$

$\frac{(y-5)^2}{36}-\frac{(x+2)^2}{18}=1$

$\frac{6}{\sqrt{18}}=\frac{6}{3\sqrt{2}}=\frac{6\sqrt{2}}{6}=\sqrt{2}$

$\sqrt{18}$

$36+18$

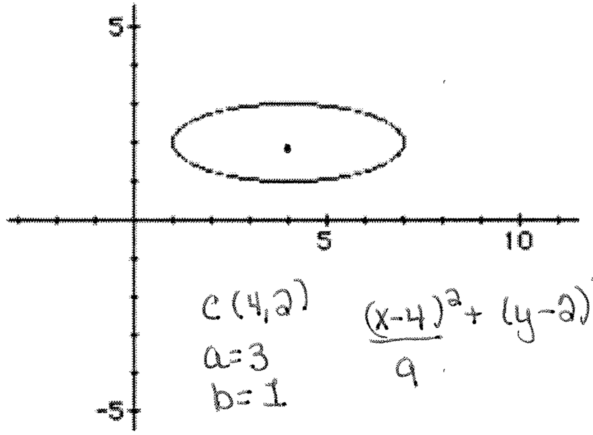
$c=\sqrt{54}=3\sqrt{6}$

$9\cdot 6$

$3\sqrt{6}$

III. Write the equation of the conic shown:

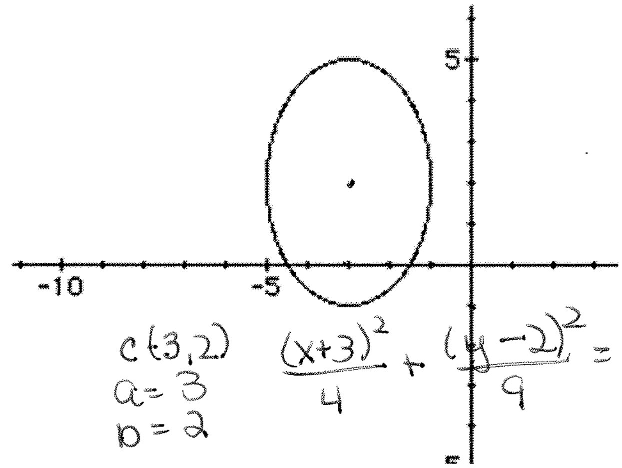
5.



C (4,2)
a=3
b=1

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

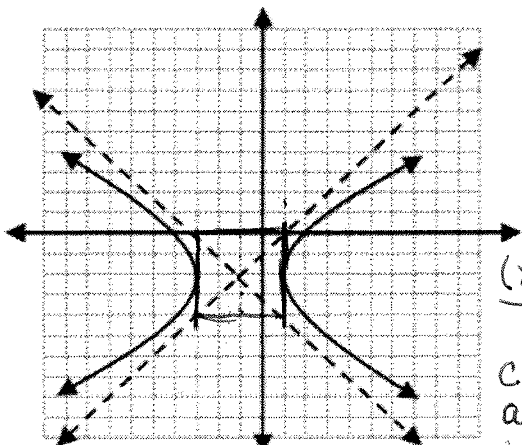
6.



c (-3,2)
a= 3
b = 2

$$\frac{(x+3)^2}{4}+\frac{(y-2)^2}{9}=1$$

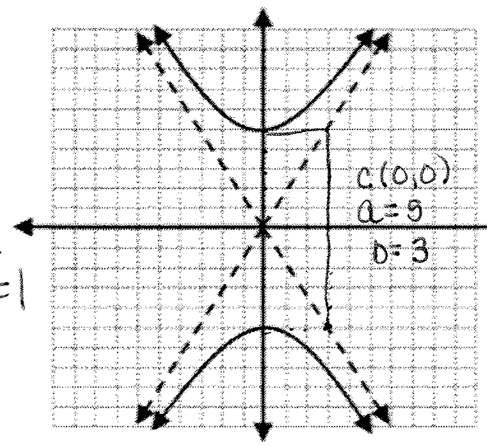
7.



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

C (-1,-2)
a=2
b=2

8.



c (0,0)
a=5
b=3

$$\frac{y^2}{25}-\frac{x^2}{9}=1$$

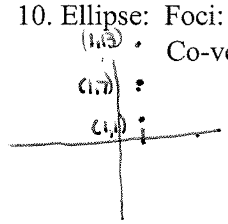
IV. Find the equation of each conic from the given information.

$\frac{36}{3}$ $c=6\sqrt{3}$ $c^2=a^2-36$
$108=a^2-36$
$a^2=144$

9. Ellipse: Center: (2, 5)
Vertical Major Axis Length: 12 $a=6$
Minor Axis Length: 10 $b=5$

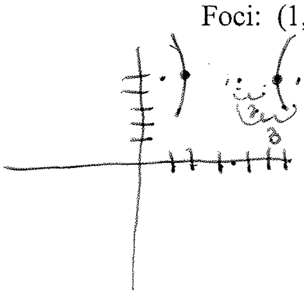
$$\frac{(x-2)^2}{25}+\frac{(y-5)^2}{36}=1$$

10. Ellipse: Foci: $(1+6\sqrt{3},7),(1-6\sqrt{3},7)$
Co-vertices: (1, 13), (1, 1)
center (1,7)



$$\frac{(x-1)^2}{144}+\frac{(y-7)^2}{36}=1$$

11. Hyperbola: Vertices: (2, 5) and (6, 5)
Foci: (1, 5) and (7, 5)

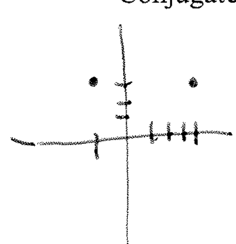


center (4,5)

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

$4+b^2=9$

12. Hyperbola: Center (-1, 3)
Horizontal Transverse Axis Length: 10
Conjugate Axis Length: 6



$$\frac{(x+1)^2}{25}-\frac{(y-3)^2}{9}=1$$

197.5
2.25
25
224.75

V. Determine the standard form for each of the following.

180
−36
144

13. Hyperbola: $4y^2 - 36x^2 - 72x + 8y = 176$

$4y^2 + 8y \quad -36x^2 - 72x \quad = 176$

$4(y^2 + 2y + 1) - 36(x^2 + 2x + 1) = 176 + 4 - 36$

$\frac{4(y+1)^2}{144} - \frac{36(x+1)^2}{144} = \frac{144}{144}$ $\quad \frac{(y+1)^2}{36} - \frac{(x+1)^2}{4} = 1$

14. Hyperbola: $16x^2 - 9y^2 + 64x = 89 - 18y$

$16x^2 + 64x - 9y^2 + 18y = 89$

$16(x^2 + 4x + 4) - 9(y^2 - 2y + 1) = 89 + 64 - 9$

$16(x+2)^2 - 9(y-1)^2 = 144$

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

15. Ellipse: $9x^2 + 25y^2 - 9x - 50y - 197.5 = 0$

$9(x^2 - 1x + 1/4) + 25(y^2 - 2y + 1) = 197.5 + 9/4 + 25$

$9(x - 1/2)^2 + 25(y-1)^2 = 224.75$

$\frac{9(x - 1/2)^2}{224.75} + \frac{25(y-1)^2}{224.75} = 1$

$\frac{36(x-1)^2}{89} + \frac{100(y-1)^2}{89} = 1$

16. Ellipse: $16x^2 + 4y^2 + 96x - 8y + 84 = 0$

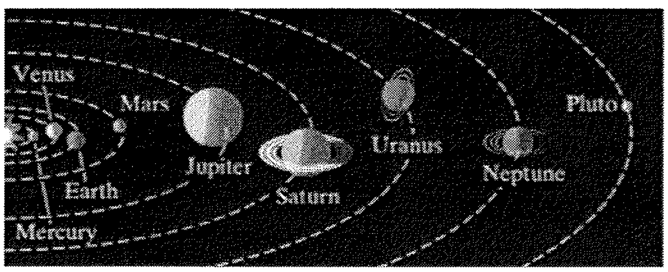
$16(x^2 + 6x + 9) + 4(y^2 - 2y + 1) = -84 + 144 + 4$

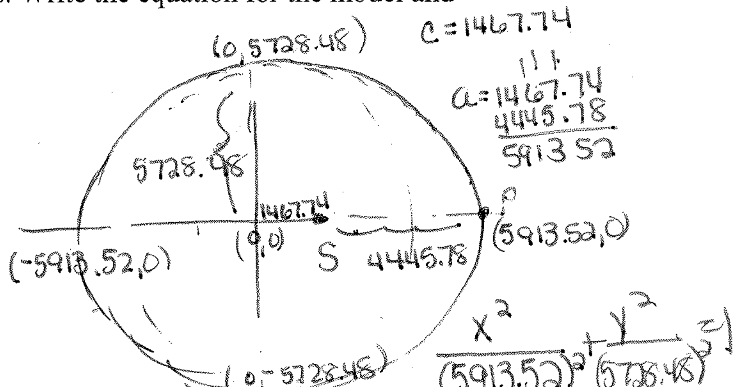
$16(x+3)^2 + 4(y-1)^2 = 64$

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

VI. Solve.

17. The orbit of the planet Pluto around the Sun can be modeled by an ellipse, with the Sun at one focus. The Sun is approximately 1467.74 million kilometers from the center of the ellipse. At its closest point, Pluto is approximately 4445.78 million kilometers from the Sun. The minimum distance from Pluto to the center of the ellipse is approximately 5728.48 kilometers. Write the equation for the model and sketch the graph of the equation.



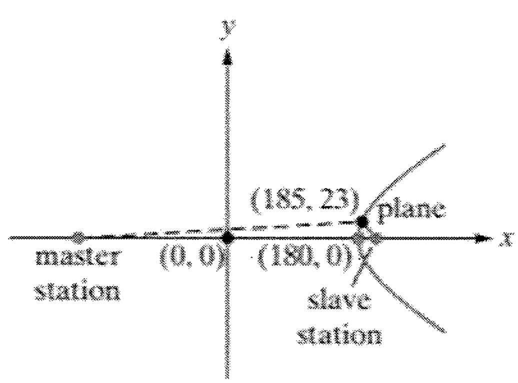


$c = 1467.74$

$a = 1467.74 + 4445.78 = 5913.52$

$\frac{x^2}{(5913.52)^2} + \frac{y^2}{(5728.48)^2} = 1$

18. In the figure, an aircraft is guided using a navigation system that employs hyperbolic tracking. Write an equation that models the hyperbola depicted.



$\frac{x^2}{(180)^2} - \frac{y^2}{b^2} = 1$ $\quad \frac{x^2}{(180)^2} - \frac{73y^2}{685584} = 1$

$\frac{(185)^2}{(180)^2} - \frac{(23)^2}{b^2} = 1$

$-\frac{(23)^2}{b^2} = 1 - \left(\frac{185^2}{180^2}\right)$

$-\frac{23^2}{b^2} = \frac{-73}{1296}$

$\frac{(23)^2(1296)}{73} = b^2$

$\frac{685584}{73}$