7.3 Practice Problems

1. For the equation of an ellipse find the following. $\frac{(x+1)^2}{16}+\frac{(y-2)^2}{9}=1$

   a. the center of the ellipse.

   $(-1,2)$

   b. the verticies of the ellipse.

   $(-5,2)\ (3,2)$

   c. the foci of the ellipse.

   $(-1-\sqrt{7},2)\ (-1+\sqrt{7},2)$

   d. graph the equation.

$a=4 \quad b=3$

major axis is horizontal

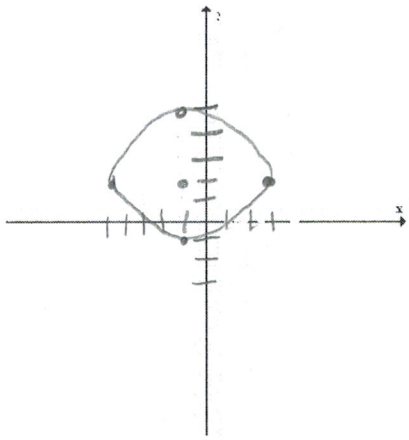
$b^2=a^2-c^2$

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

$c^2=16-9$

$c^2=7$

$c=\sqrt{7}$



2. For the equation of an ellipse find the following.

   $4x^2+9y^2-24x+18y+9=0$

   a. rewrite the equation of the ellipse using completing the square.

$4x^2-24x+9y^2+18y \quad =-9$

$4(x^2-6x+\_)+9(y^2+2y+\_)=-9+\_+\_$

$4(x^2-6x+9)+9(y^2+2y+1)=-9+36+9$

$4(x-3)^2+9(y+1)^2=36$

   b. the center of the ellipse.

   $(3,-1)$

   c. the verticies of the ellipse.

   $(0,-1)\ (6,-1)$

   d. the foci of the ellipse.

   $(3+\sqrt{5},-1)\ (3-\sqrt{5},-1)$

   e. graph the equation.

$\frac{4(x-3)^2}{36}+\frac{9(y+1)^2}{36}=\frac{36}{36}$

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

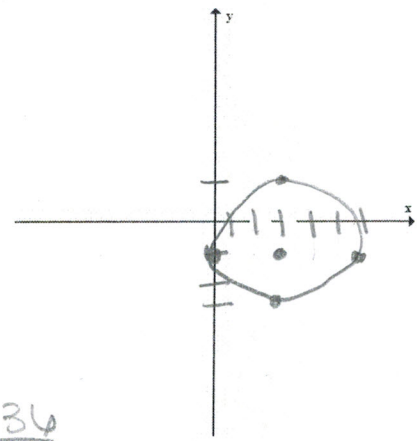
$a=3 \quad b=2$

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

$c^2=9-4$

$c^2=5$

$c=\sqrt{5}$



major axis is horizontal

3. Find an equation of the ellipse. Graph the equation.

   Foci at $(\pm 4,0)$; the length of the major axis is 10.

$c=4$

$a=5$

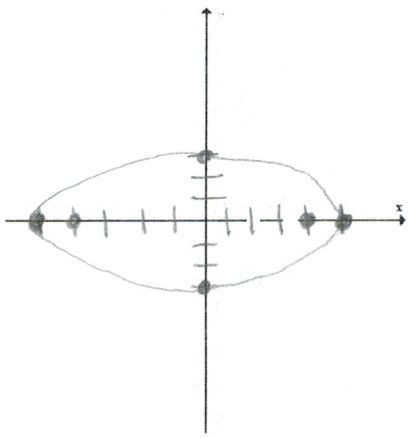
$b^2=5^2-4^2$

$b^2=25-16$

$b^2=9$

$b=3$

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



4. Find an equation of the ellipse. Graph the equation.

Center at $(1,-4)$; vertex at $(1,-1)$; focus at $(1,-6)$;

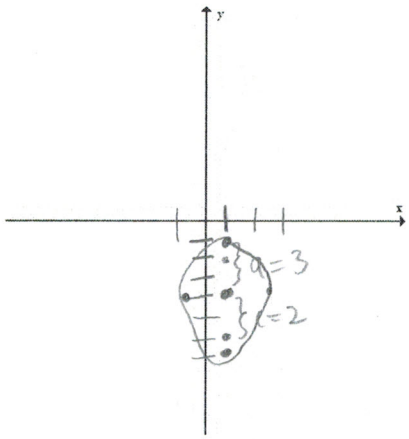
$$\frac{x^2}{b^2}+\frac{y^2}{a^2}=1$$

$$\frac{(x-1)}{5}+\frac{(y+4)^2}{9}=1$$

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

$$b^2=9-4$$

$$b^2=5$$



5. Find an equation of the ellipse. Graph the equation.

Verticies at $(0,3)$ and $(8,3)$; focus at $(6,3)$;

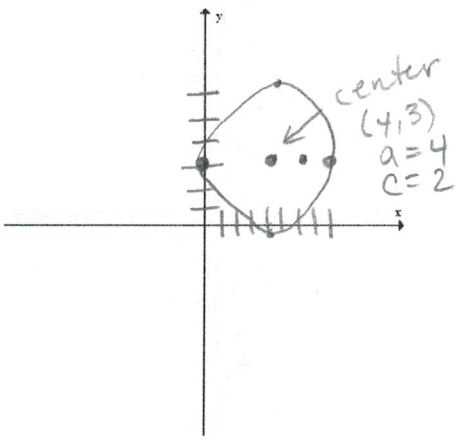
$$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$$

$$\frac{(x-4)^2}{16}+\frac{(y-3)^2}{12}=1$$

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

$$b^2=16-4$$

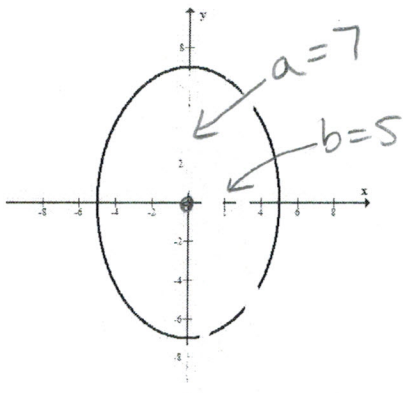
$$b^2=12$$



6. Write an equation for the ellipse.

$$\frac{x^2}{b^2}+\frac{y^2}{a^2}=1$$

$$\frac{x^2}{25}+\frac{y^2}{49}=1$$



7. Write an equation for the ellipse.

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