Write an equation in general form for each ellipse.

1. Foci at $( \pm 4,0)$; endpoints of major axis $( \pm 6,0)$


$$
\begin{aligned}
& c^{2}=a^{2}-b^{2} \\
& 16=36-b^{2} \\
& b^{2}=20
\end{aligned}
$$



$$
a=6 \text { hor. }
$$

2. Foci at $(0, \pm 4)$; endpoints of major axis $(0, \pm 7)$


$$
\begin{aligned}
& c^{2}=a^{2}-b^{2} \\
& 16=49-b^{2} \\
& b^{2}=33
\end{aligned} \quad \frac{x^{2}}{33}+\frac{y^{2}}{49}=1
$$

center $(0,0)$
3. Write the equation of the ellipse with a major axis from $(-3,5)$ to $(9,5)$ and a minor axis that is 4 units long.


$$
\begin{aligned}
2 a & =12 \\
a & =6
\end{aligned}
$$

4. Write the equation of the ellipse with a center at ( $1,-8$ ), a focus at ( $1,-2$ ), and the end of the major axis at $(1,0)$ a $c=6$

$$
\begin{aligned}
& c^{2}=a^{2}-b^{2} \\
& 36=64-b^{2} \\
& b^{2}=28 \\
& \quad \frac{(x-1)^{2}}{28}+\frac{(y+8)^{2}}{64}=1
\end{aligned}
$$

Transform each of the following equations into general form of an ellipse and then graph the ellipse. Then find the distance from the center to the focus point.
5.

$$
\begin{aligned}
& \begin{array}{l}
4 x^{2}+9 y^{2}-16 x+90 y+205=0 \\
4 x^{2}-16 x+9 y^{2}+90 y=-205 \\
4\left(x^{2}-4 x+4\right)+9\left(y^{2}+10 y+25\right) \\
\frac{4(x-2)^{2}}{36}+9(y+5)^{2}=36 \\
36 \\
\frac{(x-2)^{2}}{9}+\frac{(y+5)^{2}}{4}=1
\end{array} \begin{array}{l}
\text { center }(2,-5) \\
a=3 \text { hor. } \\
b=2
\end{array} \begin{array}{l}
\text { C= }=\sqrt{5} \\
\text { foci }(2 \pm \sqrt{5},-5)
\end{array}
\end{aligned}
$$

6. 
7. $49 x^{2}+16 y^{2}+98 x-64 y-671=0$ $a=6$
$b=2$
$C=\sqrt{32}$ foci $(-5 \pm \sqrt{32}, 4))$

$$
49 x^{2}+98 x+16 y^{2}-64 y=671
$$

$$
\begin{aligned}
& \frac{49(x+1)^{2}}{784}+\frac{16(y-2)^{2}}{784}=\frac{784}{784} \\
& \frac{(x+1)^{2}}{16}+\frac{(y-2)^{2}}{49}=1
\end{aligned}
$$

center $(-1,2)$


$$
\left.\begin{array}{rl}
49\left(x^{2}+2 x+1\right.
\end{array}\right)+16\left(y^{2}-4 y+4\right)=671
$$

 $a=7$ vert.

$$
\begin{array}{ll}
a=7 & \text { vert. } \\
b=4 & c=\sqrt{33} \quad \text { foci }(-1,2 \pm \sqrt{33})
\end{array}
$$

$$
\begin{aligned}
& 4 x^{2}+36 y^{2}+40 x-288 y+532=0 \\
& 4 x^{2}+40 x+36 y^{2}-288 y=-532 \\
& \begin{aligned}
4\left(x^{2}+10 x+25\right) & +36\left(y^{2}-8 y+16\right)
\end{aligned}=-5320 \\
& \frac{4(x+5)^{2}}{144}+\frac{36(y-4)^{2}}{144}=\frac{144}{144} \\
& \frac{(x+5)^{2}}{36}+\frac{(y-4)^{2}}{4}=1 \\
& \text { center } \\
& \begin{array}{c}
(-5,4) \\
a=6 \\
b=2
\end{array}
\end{aligned}
$$

