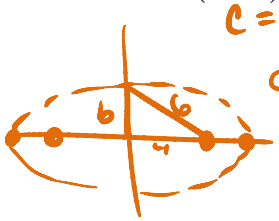
Precalculus **Name** DiMarco

Homework Ellipses Day 2

Write an equation in general form for each ellipse.

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

$c = 4$ $a = 6$ hor.



center $(0,0)$

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

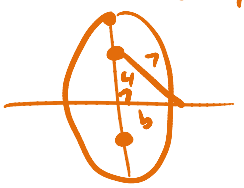
$16 = 36 - b^2$

$b^2 = 20$

$$\boxed{\frac{x^2}{36} + \frac{y^2}{20} = 1}$$

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

$c = 4$ $a = 7$ vertical



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

$16 = 49 - b^2$

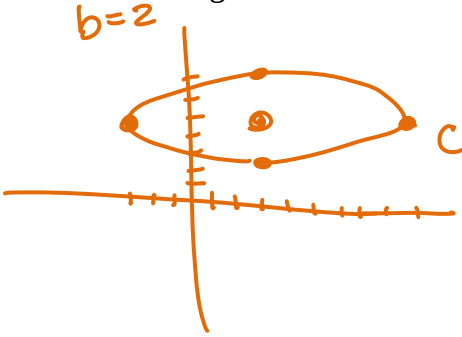
$b^2 = 33$

$$\boxed{\frac{x^2}{33} + \frac{y^2}{49} = 1}$$

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.

$b = 2$ $2a = 12$ $a = 6$

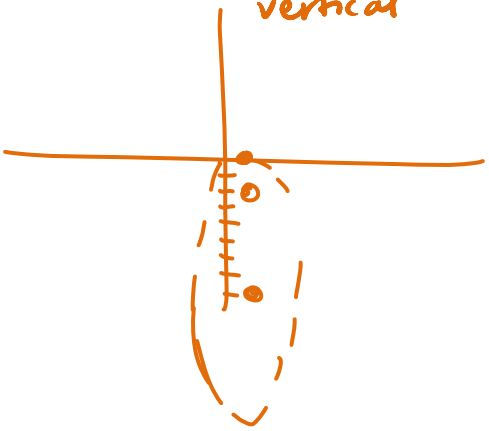


center $(3, 5)$

$$\boxed{\frac{(x-3)^2}{36} + \frac{(y-5)^2}{4} = 1}$$

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)

$c = 6$ $a = 8$ vertical



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

$36 = 64 - b^2$

$b^2 = 28$

$$\boxed{\frac{(x-1)^2}{28} + \frac{(y+8)^2}{64} = 1}$$

OVER!

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.

$$\begin{array}{r} 25 \\ \times\ 9 \\ \hline 225 \end{array}$$

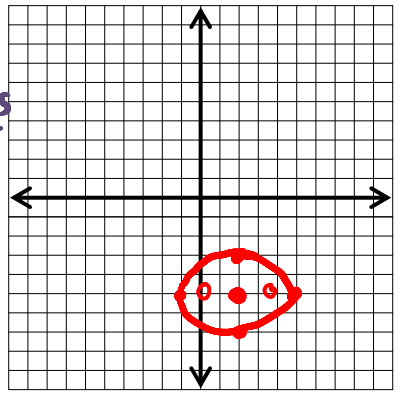
5. $4x^2 + 9y^2 - 16x + 90y + 205 = 0$

$4x^2 - 16x + 9y^2 + 90y = -205$

$4(x^2 - 4x + \underline{4}) + 9(y^2 + 10y + \underline{25}) = -205 + \underline{16} + \underline{225}$

$\frac{4(x-2)^2}{36} + \frac{9(y+5)^2}{36} = \frac{36}{36}$

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



center $(2,-5)$
$a=3$ hor.
$b=2$

$\boxed{c = \sqrt{5}}$

$\boxed{\text{foci } (2 \pm \sqrt{5}, -5)}$

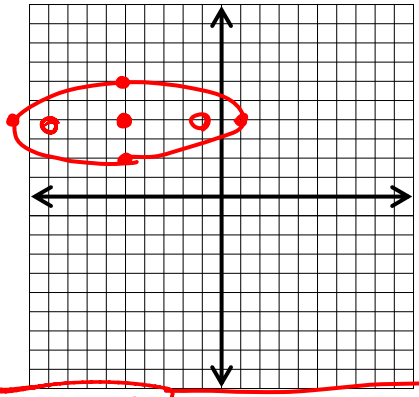
6. $4x^2 + 36y^2 + 40x - 288y + 532 = 0$

$4x^2 + 40x + 36y^2 - 288y = -532$

$4(x^2 + 10x + \underline{25}) + 36(y^2 - 8y + \underline{16}) = -532 + \underline{100} + \underline{576}$

$\frac{4(x+5)^2}{144} + \frac{36(y-4)^2}{144} = \frac{144}{144}$

$$\boxed{\frac{(x+5)^2}{36} + \frac{(y-4)^2}{4} = 1}$$



center $(-5,4)$
$a=6$ hor
$b=2$

$\boxed{c=\sqrt{32}}$ $\boxed{\text{foci } (-5 \pm \sqrt{32}, 4)}$

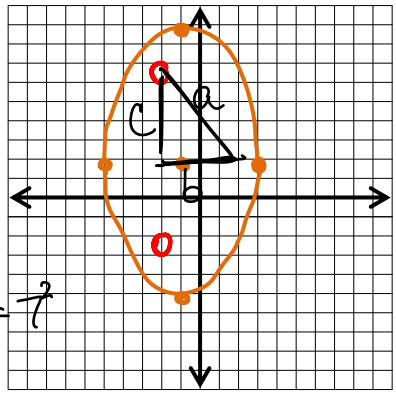
7. $49x^2 + 16y^2 + 98x - 64y - 671 = 0$

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

$49(x^2 + 2x + \underline{1}) + 16(y^2 - 4y + \underline{4}) = 671 + \underline{49} + \underline{64}$

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

$$\boxed{\frac{(x+1)^2}{16} + \frac{(y-2)^2}{49} = 1}$$



$c^2 + 4^2 = 7^2$

center $(-1,2)$
$a=7$ vert.
$b=4$

$\boxed{c=\sqrt{33}}$ $\boxed{\text{foci } (-1, 2 \pm \sqrt{33})}$