

Name: _____
PC: Ellipse Do Now

Date: _____
Ms. Loughran

1. Given $\frac{(x-1)^2}{25} + \frac{(y+2)^2}{49} = 1$. Find each of the following and then make a sketch.

VMA

$$a=7 \updownarrow$$
$$b=5 \rightarrow$$

$$c^2 = 49 - 25 = 24$$

$$c = \sqrt{24} \updownarrow$$

Center: $(1, -2)$

Major axis length: $= 2a$

$$2(7) = 14$$

Minor axis length: $= 2b$

$$2(5) = 10$$

Vertices:

$$(1, -2 \pm 7) \left\{ \begin{array}{l} (1, 5) \\ (1, -9) \end{array} \right.$$

Covertices:

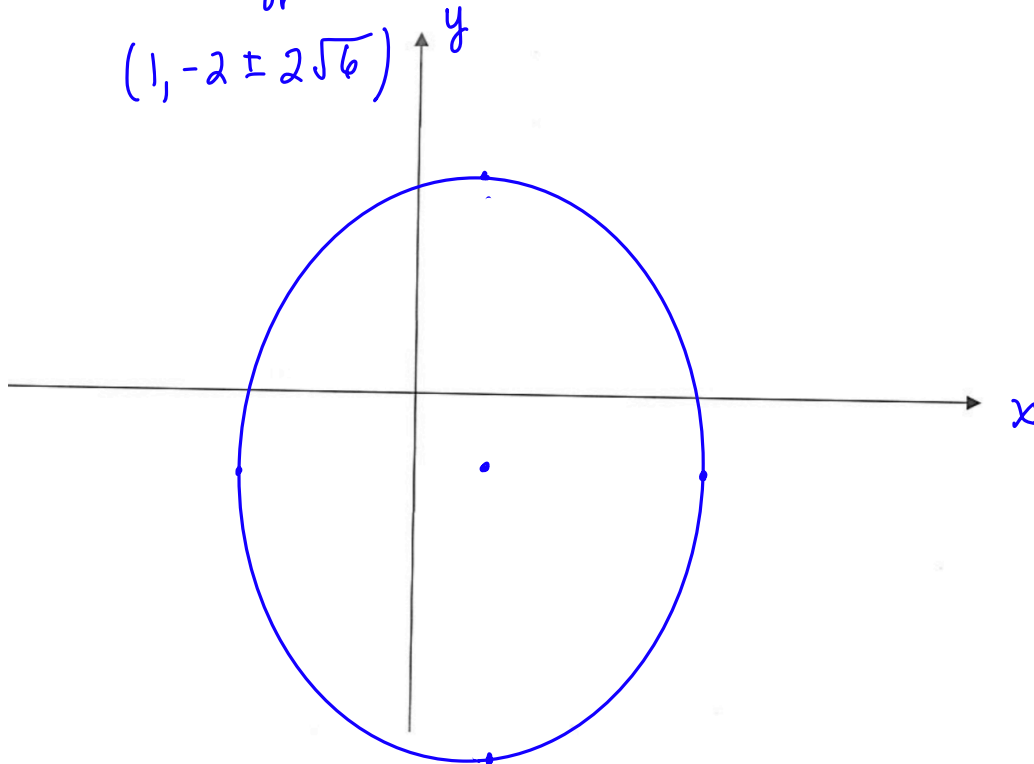
$$(1 \pm 5, -2) \left\{ \begin{array}{l} (6, -2) \\ (-4, -2) \end{array} \right.$$

Foci:

$$(1, -2 \pm \sqrt{24})$$

or

$$(1, -2 \pm 2\sqrt{6})$$



Continuing from yesterday...

Find the coordinates of the center, the foci, the vertices and covertices of the ellipse with the equation:

5. $4x^2 + y^2 - 8x + 6y + 9 = 0$

$$4x^2 - 8x + y^2 + 6y = -9$$

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

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

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

Center: $(1, -3)$

VMA

$a = 2 \updownarrow$ Vertices: $(1, -3 \pm 2)$ $\left\langle \begin{matrix} (1, -1) \\ (1, -5) \end{matrix} \right.$

$b = 1 \leftarrow$ Covertices: $(1 \pm 1, -3)$ $\left\langle \begin{matrix} (2, -3) \\ (0, -3) \end{matrix} \right.$

$c^2 = 4 - 1 = 3$

$c = \sqrt{3} \updownarrow$ foci: $(1, -3 \pm \sqrt{3})$

6. $4x^2 + 9y^2 - 8x - 54y + 49 = 0$

$$4x^2 - 8x + 9y^2 - 54y = -49$$

$$4(x^2 - 2x + 1) + 9(y^2 - 6y + 9) = -49 + 4 + 81$$

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

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

Center: $(1, 3)$

HMA

$a = 3 \leftarrow$

$b = 2 \updownarrow$

$c^2 = 9 - 4 = 5$

$c = \sqrt{5} \leftarrow$

Vertices: $(1 \pm 3, 3)$ $\left\langle \begin{matrix} (4, 3) \\ (-2, 3) \end{matrix} \right.$

Covertices: $(1, 3 \pm 2)$ $\left\langle \begin{matrix} (1, 5) \\ (1, 1) \end{matrix} \right.$

foci: $(1 \pm \sqrt{5}, 3)$

7. $9x^2 + 4y^2 - 18x + 16y = 11$

$$9(x^2 - 2x + 1) + 4(y^2 + 4y + 4) = 11 + 9 + 16$$

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

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

Center: $(1, -2)$

Vertices: $(1, -2 \pm 3)$ $\left\langle \begin{matrix} (1, 1) \\ (1, -5) \end{matrix} \right.$

Covertices: $(1 \pm 2, -2)$ $\left\langle \begin{matrix} (3, -2) \\ (-1, -2) \end{matrix} \right.$

foci: $(1, -2 \pm \sqrt{5})$

$a = 3 \updownarrow$

$b = 2 \leftarrow$

$c = \sqrt{5} \updownarrow$

Homework 04-17

Identify the center, vertices, co-vertices, foci, length of the major axis, and length of the minor axis of each.

$$2) \frac{x^2}{36} + \frac{y^2}{16} = 1$$

Center: (0, 0)

Vertices: (6, 0), (-6, 0) or $(\pm 6, 0)$

Co-vertices: (0, 4), (0, -4) or $(0, \pm 4)$

Foci: $(2\sqrt{5}, 0), (-2\sqrt{5}, 0)$ or $(\pm 2\sqrt{5}, 0)$ or $(\pm\sqrt{20}, 0)$

Major Axis: 12 units

Minor Axis: 8 units

$$4) \frac{x^2}{169} + \frac{y^2}{64} = 1$$

Center: (0, 0)

Vertices: (13, 0), (-13, 0)

Co-vertices: (0, 8), (0, -8)

Foci: $(\sqrt{105}, 0), (-\sqrt{105}, 0)$

Major Axis: 26 units

Minor Axis: 16 units

$$6) \frac{(x+5)^2}{81} + \frac{(y-1)^2}{144} = 1$$

Center: (-5, 1)

Vertices: (-5, 13), (-5, -11)

Co-vertices: (4, 1), (-14, 1)

Foci: $(-5, 1 + 3\sqrt{7}), (-5, 1 - 3\sqrt{7})$ or $(-5, 1 \pm \sqrt{63})$

Major Axis: 24 units

Minor Axis: 18 units

$$8) \frac{x^2}{64} + \frac{(y-8)^2}{9} = 1$$

Center: (0, 8)

Vertices: (8, 8), (-8, 8)

Co-vertices: (0, 11), (0, 5)

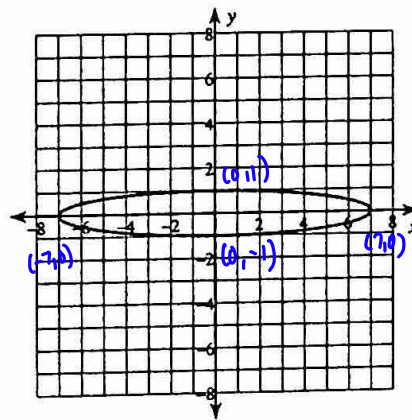
Foci: ($\sqrt{55}$, 8), ($-\sqrt{55}$, 8)

Major Axis: 16 units

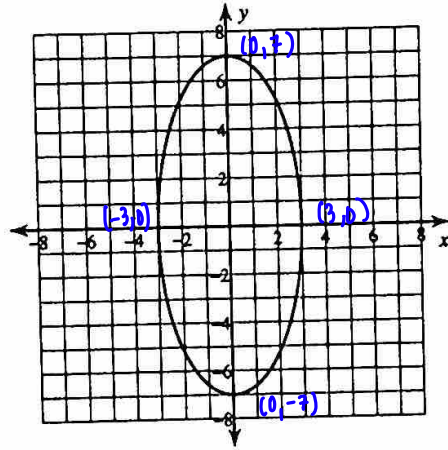
Minor Axis: 6 units

$$10) \frac{x^2}{49} + \frac{y^2}{1} = 1$$

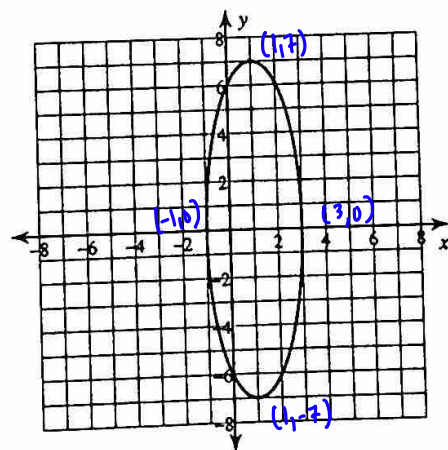
$a=7 \rightarrow$
 $b^2=1, b=1 \updownarrow$



$$12) \frac{x^2}{9} + \frac{y^2}{49} = 1$$



$$14) \frac{(x-1)^2}{4} + \frac{y^2}{49} = 1$$



$$16) (x+5)^2 + \frac{y^2}{49} = 1$$

