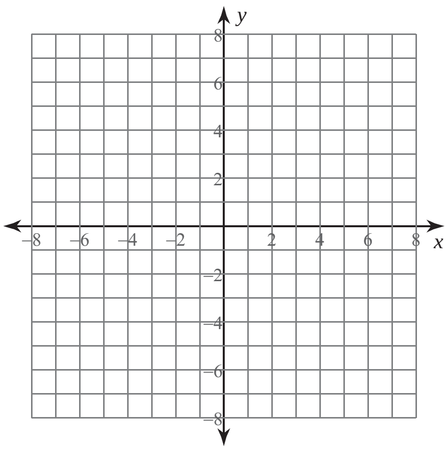
Name_____________________________________

Ellipses

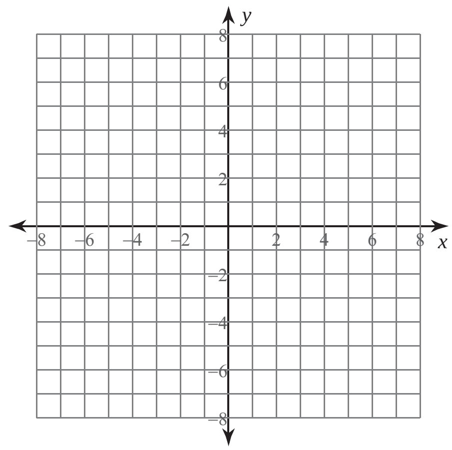
Date__________________ Period____

Identify the center, vertices, co-vertices, and foci of each. Then sketch the graph.

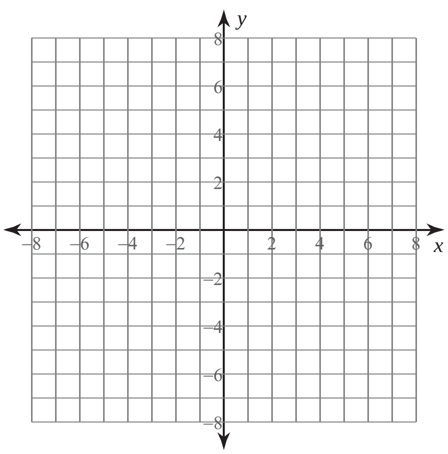
1) $\dfrac{(x+3)^2}{16} + \dfrac{(y-1)^2}{4} = 1$



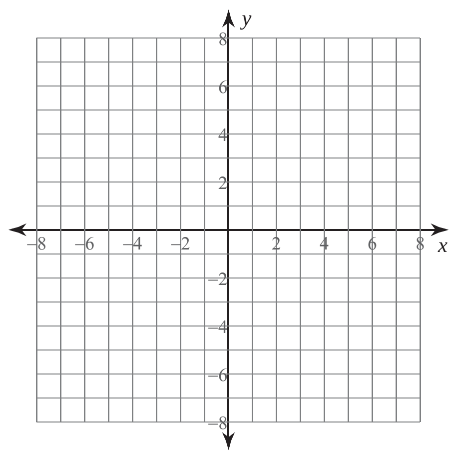
2) $\dfrac{(x-3)^2}{5} + \dfrac{(y-1)^2}{15} = 1$



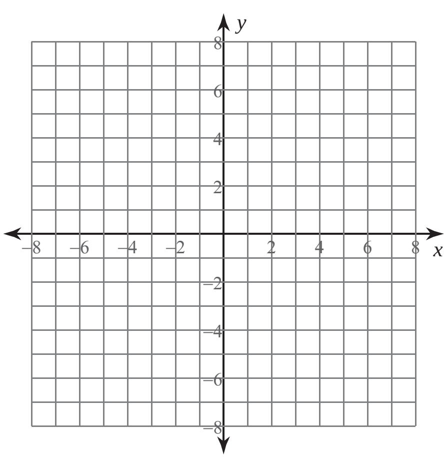
3) $\dfrac{(x-1)^2}{9} + \dfrac{(y+5)^2}{4} = 1$



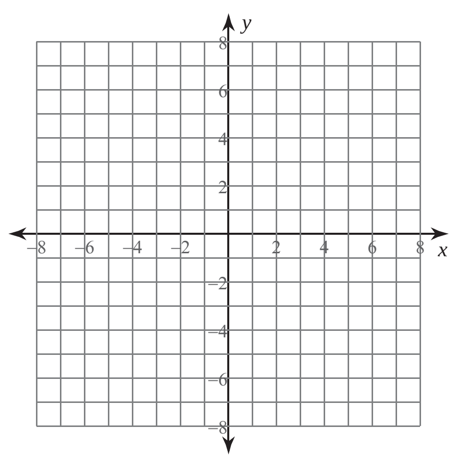
4) $\dfrac{x^2}{49} + \dfrac{(y-3)^2}{9} = 1$



5) $x^2 + 9y^2 + 6x - 90y + 225 = 0$



6) $9x^2 + 4y^2 - 36x + 24y + 36 = 0$



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

7) $3x^2 + 35y^2 - 60x + 140y - 85 = 0$

8) $36x^2 + 5y^2 - 90y - 495 = 0$

Use the information provided to write the standard form equation of each ellipse.

9) Vertices: $(6, -6), (-10, -6)$
Foci: $(-2 + 2\sqrt{7}, -6), (-2 - 2\sqrt{7}, -6)$

10) Vertices: $(13, 9), (-3, 9)$
Foci: $(5 + 2\sqrt{7}, 9), (5 - 2\sqrt{7}, 9)$

11) Vertices: $(5, 9), (-13, 9)$
Co-vertices: $(-4, 14), (-4, 4)$

12) Foci: $(3, 10 + \sqrt{105}), (3, 10 - \sqrt{105})$
Co-vertices: $(11, 10), (-5, 10)$

13) Foci: $\left(\frac{4\sqrt{35} + 7}{2}, \frac{3}{2}\right), \left(\frac{-4\sqrt{35} + 7}{2}, \frac{3}{2}\right)$
Endpoints of minor axis: $\left(\frac{7}{2}, \frac{7}{2}\right), \left(\frac{7}{2}, -\frac{1}{2}\right)$

14) Center: $(-8, 5)$
Vertex: $(-8, 15)$
Focus: $(-8, 5 + \sqrt{51})$

15) Endpoints of major axis:
$(-4, -6), (-16, -6)$

Endpoints of minor axis:
$(-10, -2), (-10, -10)$

16) Eccentricity $= \frac{\sqrt{15}}{4}$
Center: $(-5, 5)$
Co-vertex: $(-8, 5)$

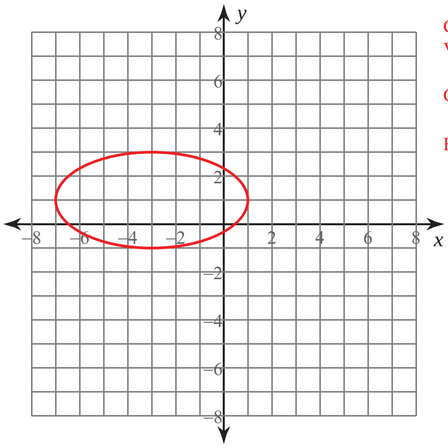
Name________________________________

Ellipses

Date________________ Period____

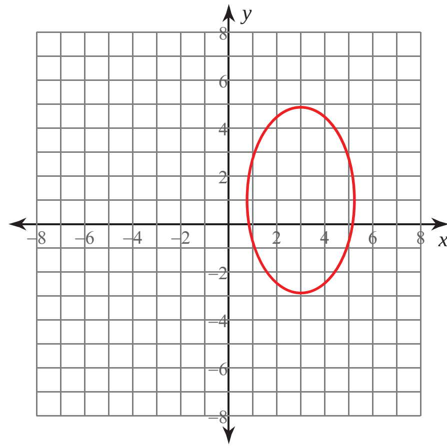
Identify the center, vertices, co-vertices, and foci of each. Then sketch the graph.

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



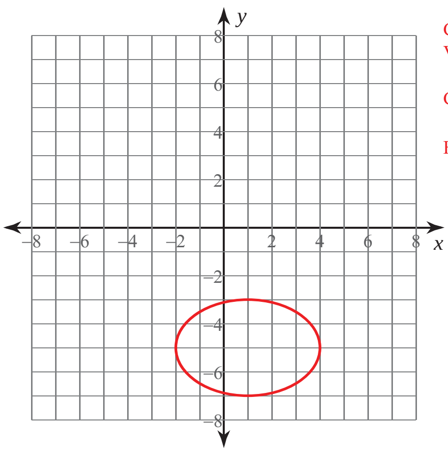
Center: $(-3, 1)$
Vertices: $(1, 1)$
$(-7, 1)$
Co-vertices: $(-3, 3)$
$(-3, -1)$
Foci: $(-3 + 2\sqrt{3}, 1)$
$(-3 - 2\sqrt{3}, 1)$

2) $\frac{(x-3)^2}{5} + \frac{(y-1)^2}{15} = 1$



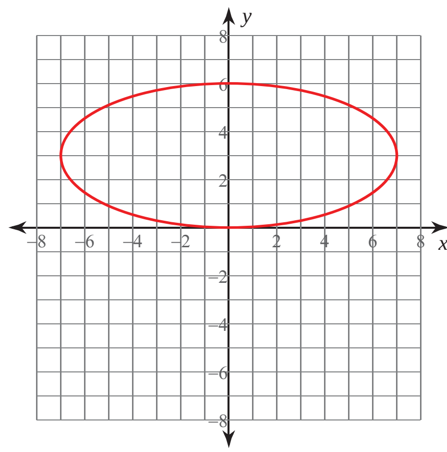
Center: $(3, 1)$
Vertices: $(3, 1 + \sqrt{15})$
$(3, 1 - \sqrt{15})$
Co-vertices: $(3 + \sqrt{5}, 1)$
$(3 - \sqrt{5}, 1)$
Foci: $(3, 1 + \sqrt{10})$
$(3, 1 - \sqrt{10})$

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



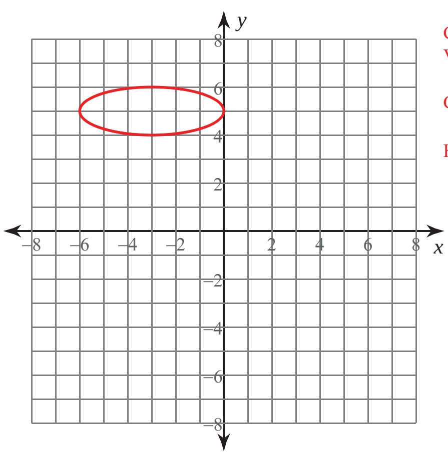
Center: $(1, -5)$
Vertices: $(4, -5)$
$(-2, -5)$
Co-vertices: $(1, -3)$
$(1, -7)$
Foci: $(1 + \sqrt{5}, -5)$
$(1 - \sqrt{5}, -5)$

4) $\frac{x^2}{49} + \frac{(y-3)^2}{9} = 1$



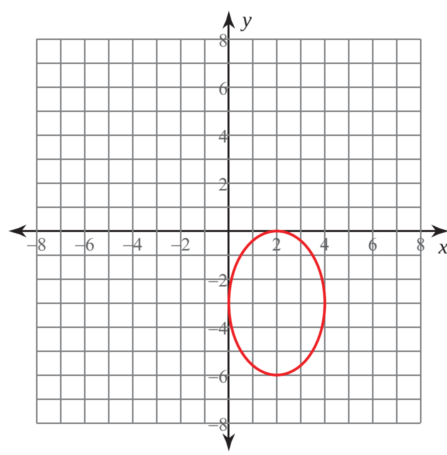
Center: $(0, 3)$
Vertices: $(7, 3)$
$(-7, 3)$
Co-vertices: $(0, 6)$
$(0, 0)$
Foci: $(2\sqrt{10}, 3)$
$(-2\sqrt{10}, 3)$

5) $x^2 + 9y^2 + 6x - 90y + 225 = 0$



Center: $(-3, 5)$
Vertices: $(0, 5)$
$(-6, 5)$
Co-vertices: $(-3, 6)$
$(-3, 4)$
Foci: $(-3 + 2\sqrt{2}, 5)$
$(-3 - 2\sqrt{2}, 5)$

6) $9x^2 + 4y^2 - 36x + 24y + 36 = 0$



Center: $(2, -3)$
Vertices: $(2, 0)$
$(2, -6)$
Co-vertices: $(4, -3)$
$(0, -3)$
Foci: $(2, -3 + \sqrt{5})$
$(2, -3 - \sqrt{5})$

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

7) $3x^2 + 35y^2 - 60x + 140y - 85 = 0$

Center: $(10, -2)$
Vertices: $(10 + 5\sqrt{7}, -2), (10 - 5\sqrt{7}, -2)$
Co-vertices: $(10, -2 + \sqrt{15}), (10, -2 - \sqrt{15})$
Foci: $(10 + 4\sqrt{10}, -2), (10 - 4\sqrt{10}, -2)$
Major Axis: $10\sqrt{7}$ units
Minor Axis: $2\sqrt{15}$ units
Latus Rectum: $\frac{6\sqrt{7}}{7}$ units
Eccentricity: $\frac{4\sqrt{70}}{35} \approx 0.956$

8) $36x^2 + 5y^2 - 90y - 495 = 0$

Center: $(0, 9)$
Vertices: $(0, 9 + 6\sqrt{5}), (0, 9 - 6\sqrt{5})$
Co-vertices: $(5, 9), (-5, 9)$
Foci: $(0, 9 + \sqrt{155}), (0, 9 - \sqrt{155})$
Major Axis: $12\sqrt{5}$ units
Minor Axis: 10 units
Latus Rectum: $\frac{5\sqrt{5}}{3}$ units
Eccentricity: $\frac{\sqrt{31}}{6} \approx 0.928$

Use the information provided to write the standard form equation of each ellipse.

9) Vertices: $(6, -6), (-10, -6)$
Foci: $(-2 + 2\sqrt{7}, -6), (-2 - 2\sqrt{7}, -6)$

$$\frac{(x + 2)^2}{64} + \frac{(y + 6)^2}{36} = 1$$

10) Vertices: $(13, 9), (-3, 9)$
Foci: $(5 + 2\sqrt{7}, 9), (5 - 2\sqrt{7}, 9)$

$$\frac{(x - 5)^2}{64} + \frac{(y - 9)^2}{36} = 1$$

11) Vertices: $(5, 9), (-13, 9)$
Co-vertices: $(-4, 14), (-4, 4)$

$$\frac{(x + 4)^2}{81} + \frac{(y - 9)^2}{25} = 1$$

12) Foci: $(3, 10 + \sqrt{105}), (3, 10 - \sqrt{105})$
Co-vertices: $(11, 10), (-5, 10)$

$$\frac{(x - 3)^2}{64} + \frac{(y - 10)^2}{169} = 1$$

13) Foci: $\left(\frac{4\sqrt{35} + 7}{2}, \frac{3}{2}\right), \left(\frac{-4\sqrt{35} + 7}{2}, \frac{3}{2}\right)$
Endpoints of minor axis: $\left(\frac{7}{2}, \frac{7}{2}\right), \left(\frac{7}{2}, -\frac{1}{2}\right)$

$$\frac{\left(x - \frac{7}{2}\right)^2}{144} + \frac{\left(y - \frac{3}{2}\right)^2}{4} = 1$$

14) Center: $(-8, 5)$
Vertex: $(-8, 15)$
Focus: $(-8, 5 + \sqrt{51})$

$$\frac{(x + 8)^2}{49} + \frac{(y - 5)^2}{100} = 1$$

15) Endpoints of major axis: $(-4, -6), (-16, -6)$
Endpoints of minor axis: $(-10, -2), (-10, -10)$

$$\frac{(x + 10)^2}{36} + \frac{(y + 6)^2}{16} = 1$$

16) Eccentricity $= \frac{\sqrt{15}}{4}$
Center: $(-5, 5)$
Co-vertex: $(-8, 5)$

$$\frac{(x + 5)^2}{9} + \frac{(y - 5)^2}{144} = 1$$