

Conic Sections - Ellipses

I. Find the requested information for each ellipse. Graph **COMPLETELY**.

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

$c^2 = 36 - 16$

$c^2 = 20$

$c = \sqrt{20} = 2\sqrt{5}$

$e = \frac{c}{a} = \frac{2\sqrt{5}}{6} = .745$

Center: (0 , 0)

Major Axis Endpoints: (-6 , 0) and (6 , 0)

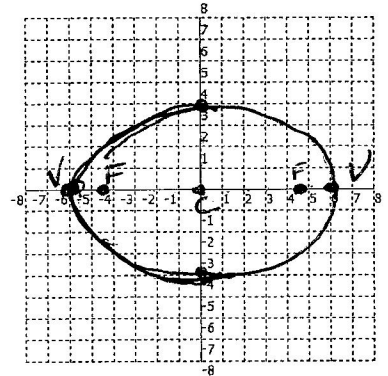
Minor Axis Endpoints: (0 , -4) and (0 , 4)

Foci: ($-2\sqrt{5}$, 0) and ($2\sqrt{5}$, 0)

Eccentricity \approx .745

Parametric Form of the Ellipse:

$x = 6\cos T + 0$ and $y = 4\sin T + 0$



2. $x = 7\cos T$

$y = 8\sin T$

Center: (_____ , _____)

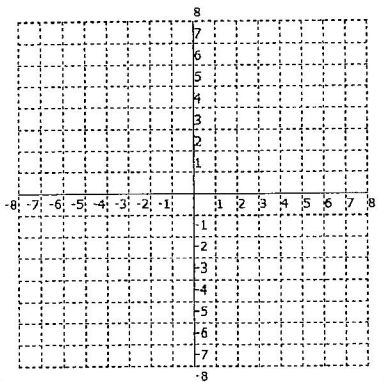
Major Axis Endpoints: (_____ , _____) and (_____ , _____)

Minor Axis Endpoints: (_____ , _____) and (_____ , _____)

Foci: (_____ , _____) and (_____ , _____)

Eccentricity \approx _____

Standard Form of the Ellipse:



3. $\frac{16x^2}{144} + \frac{9y^2}{144} = \frac{144}{144}$

$\frac{x^2}{9} + \frac{y^2}{16} = 1$

$c^2 = 16 - 9$

$c^2 = 7$

$c = \sqrt{7}$

$e = \frac{c}{a} = \frac{\sqrt{7}}{4} = .661$

Center: (0 , 0)

Major Axis Endpoints: (0 , -4) and (0 , 4)

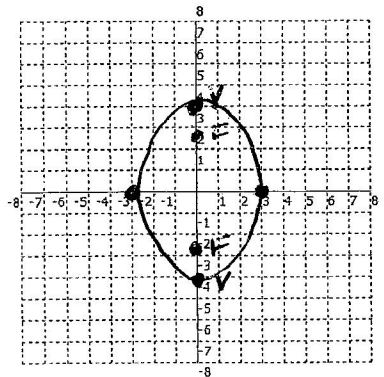
Minor Axis Endpoints: (-3 , 0) and (3 , 0)

Foci: (0 , $-\sqrt{7}$) and (0 , $\sqrt{7}$)

Eccentricity \approx .661

Parametric Form of the Ellipse:

$x = 3\cos T + 0$ and $y = 4\sin T + 0$



$$4. \frac{(x-2)^2}{16} + \frac{(y-3)^2}{9} = 1$$

Center: (____, ____)

Major Axis Endpoints: (____, ____) and (____, ____)

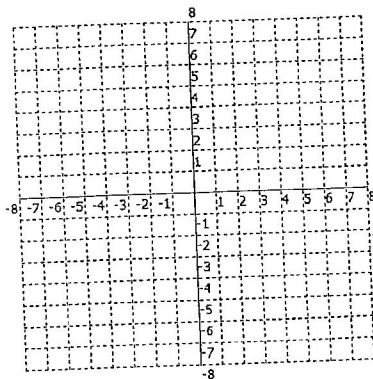
Minor Axis Endpoints: (____, ____) and (____, ____)

Foci: (____, ____) and (____, ____)

Eccentricity \approx _____

Parametric Form of the Ellipse:

$x =$ _____ and $y =$ _____



$$5. \quad x = 2 \cos T - 3$$

$$y = 4 \sin T + 5$$

Center: (____, ____)

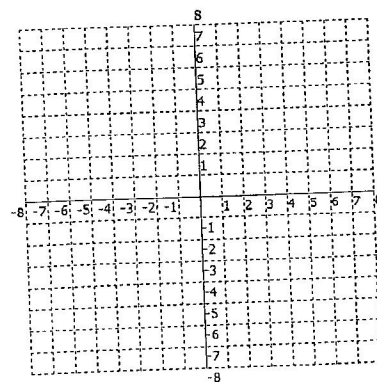
Major Axis Endpoints: (____, ____) and (____, ____)

Minor Axis Endpoints: (____, ____) and (____, ____)

Foci: (____, ____) and (____, ____)

Eccentricity \approx _____

Standard Form of the Ellipse:



$$6. \quad x^2 + 9y^2 + 4x + 18y + 4 = 0$$

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

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

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

Standard Form of the Ellipse:

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

$$c^2 = 9 - 1$$

$$c^2 = 8$$

$$c = \sqrt{8} = 2\sqrt{2}$$

$$e = \frac{c}{a} = \frac{2\sqrt{2}}{3} = .943$$

Center: (-2, -1)

Major Axis Endpoints: (-5, -1) and (1, -1)

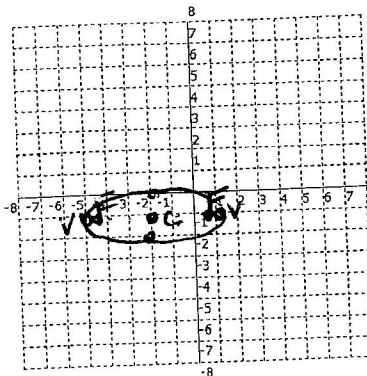
Minor Axis Endpoints: (-2, 0) and (-2, -2)

Foci: (-2 - 2\sqrt{2}, -1) and (-2 + 2\sqrt{2}, -1)

Eccentricity \approx .943

Parametric Form of the Ellipse:

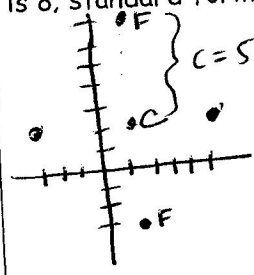
$x = 3 \cos T - 2$ and $y = 1 \sin T - 1$



II. Write the equation of each ellipse in the requested form.

7. Foci $(\pm 4, 0)$; length of the major axis is 12; parametric form

8. Foci $(1, 7)$ and $(1, -3)$; length of the minor axis is 8; standard form



center $(1, 2)$

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

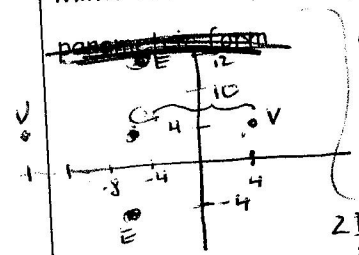
$$2b = 8 \implies b = 4 \implies b^2 = 16$$

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

$$5^2 = a^2 - 16 \implies 41 = a^2$$

9. Foci $(2, 5)$ and $(2, 1)$; Sum of the focal radii is $2\sqrt{13}$; standard form

10. Major Axis Endpoints $(-16, 4)$ and $(4, 4)$; $2a = 20 \implies a = 10 \implies a^2 = 100$
 Minor Axis Endpoints $(-6, -4)$ and $(-6, 12)$; center $(6, 4)$



~~parametric form~~

center $(6, 4)$

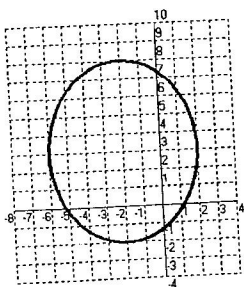
$$\frac{(x+6)^2}{100} + \frac{(y-4)^2}{64} = 1$$

$$2b = 16 \implies b = 8 \implies b^2 = 64$$

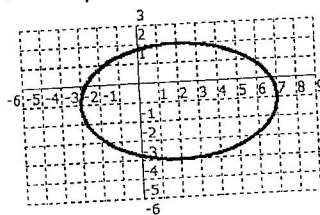
11. Sum of the focal radii is 18; Minor Axis Endpoints $(0, \pm 6\sqrt{2})$; standard form

12. One Major Axis Endpoint $(-7, -9)$; center $(-7, 6)$; one foci $(-7, 15)$; parametric form

13. in standard form



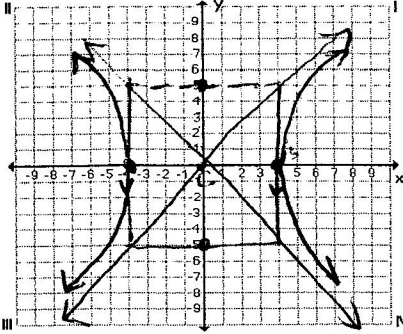
14. in parametric form



Graph the hyperbola and identify the center, vertices, foci, and asymptotes.

1. $\frac{x^2}{16} - \frac{y^2}{25} = 1$

$c^2 = a^2 + b^2$
 $c^2 = 16 + 25$
 $c = \sqrt{41}$

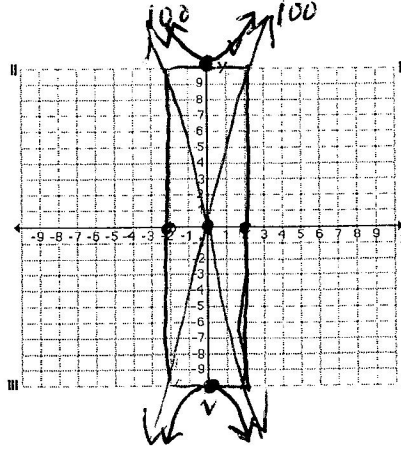


Center: $(0, 0)$
Vert: $(-4, 0), (4, 0)$
Foci: $(-\sqrt{41}, 0), (\sqrt{41}, 0)$
Asym: $y = 0 \pm \frac{5}{4}(x - 0)$
 $y = \pm \frac{5}{4}x$

$e = \frac{c}{a} = \frac{\sqrt{41}}{4} = 1.60$

2. $y^2 - 25x^2 = 100$

$\frac{y^2}{100} - \frac{x^2}{4} = 1$



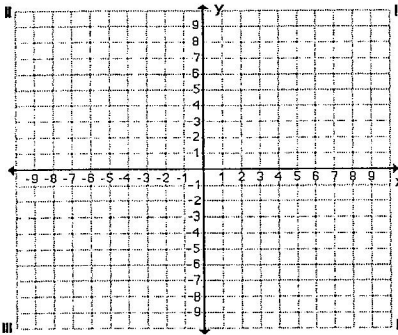
Center: $(0, 0)$
Vert: $(0, -10), (0, 10)$
Foci: $(0, -2\sqrt{26}), (0, 2\sqrt{26})$
Asym: $y = 0 \pm 5(x - 0)$
 $y = \pm 5x$

$c^2 = a^2 + b^2$
 $c^2 = 100 + 4$
 $c = \sqrt{104} = 2\sqrt{26}$

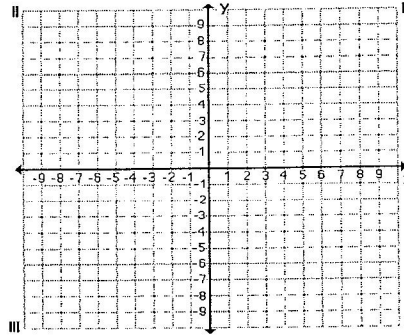
4. $\frac{y^2}{36} - \frac{(x+2)^2}{9} = 1$

$e = \frac{c}{a} = \frac{2\sqrt{26}}{10} = 1.01$

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



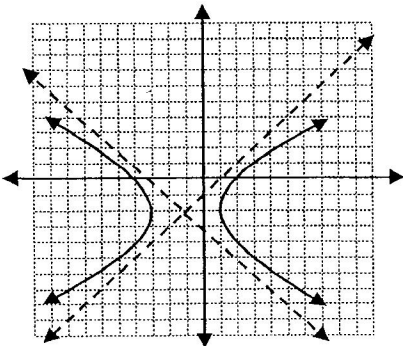
Center: _____
Vert: _____
Foci: _____
Asym: _____



Center: _____
Vert: _____
Foci: _____
Asym: _____

Find the standard form of the equation of each hyperbolas.

5.



6.

