

Math 12 H. Ellipse, H.W

pp 759-60

#2)

$$\frac{x^2}{1} + \frac{y^2}{9} = 1 \quad \square \text{ Graph IV}$$

#4)  $\frac{16x^2}{400} + \frac{25y^2}{400} = \frac{400}{400}$

$$\frac{x^2}{25} + \frac{y^2}{16} = 1 \quad \square \text{ Graph = III}$$

#6) Find vertices, foci, eccentricity, major, minor axis length sketch

$$\frac{x^2}{16} + \frac{y^2}{25} = 1 \quad a=5 \quad b=4$$

major axis is vertical

$$\text{Vertices} = (0, \pm 5)$$

$$\text{Major axis length} = 2A = 10$$

$$\text{Minor axis length} = 2B = 8$$

$$\text{Foci } (0, \pm 3)$$

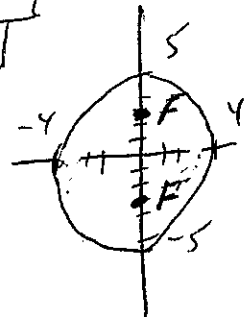
$$\text{Eccentricity} = .6$$

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

$$c^2 = 25 - 16$$

$$c = \pm 3$$

$$\text{Eccentricity} = \frac{c}{a} = \frac{3}{5}$$



10)  $\frac{4x^2}{16} + \frac{y^2}{16} = \frac{16}{16}$

Get into standard form.  
divide by 16

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

$$a=4, b=2$$

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

$$c^2 = 16 - 4$$

$$c^2 = 12$$

$$c = \pm \sqrt{12} = \pm 2\sqrt{3}$$

$$\text{Vertices} = (0, \pm 4)$$

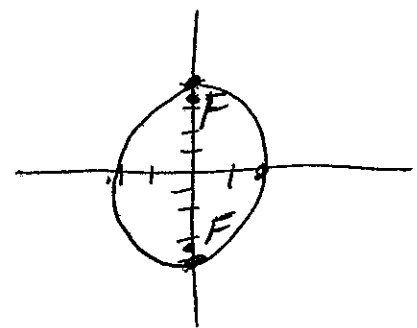
$$\text{Major axis} = 8 \quad (2A)$$

$$\text{Minor axis} = 4 \quad (2B)$$

$$\text{Foci} = (0, \pm 2\sqrt{3}) = 3.46$$

$$\text{Eccentricity} = \frac{\sqrt{3}}{2}$$

$$\text{Eccentricity} = \frac{c}{a} = \frac{2\sqrt{3}}{4} = \frac{\sqrt{3}}{2}$$



$$14) \quad 9x^2 + 4y^2 = 1$$

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

$$b = \frac{1}{3} \quad a = \frac{1}{2}$$

$$\begin{aligned} \text{Foci } c^2 &= a^2 - b^2 \\ &= \frac{1}{4} - \frac{1}{9} = \\ &= \frac{9}{36} - \frac{4}{36} = \frac{5}{36} \end{aligned}$$

$$c = \pm \sqrt{\frac{5}{36}} = \pm \frac{\sqrt{5}}{6}$$

vertices  $(0, \pm \frac{1}{2})$

length major axis = 1  $(2 \cdot \frac{1}{2})$  (y)

length minor axis =  $\frac{2}{3}$   $(2 \cdot \frac{1}{3})$  (x)

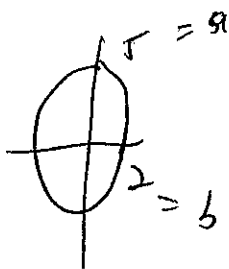
Foci  $(0, \pm \frac{\sqrt{5}}{6})$

Eccentricity =  $\frac{\sqrt{5}}{3}$

$$\text{eccentricity} = \frac{c}{a} = \frac{\frac{\sqrt{5}}{6}}{\frac{1}{2}}$$

$$= \frac{\sqrt{5}}{6} \cdot \frac{2}{1} = \left| \frac{\sqrt{5}}{3} \right|$$

20)



$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

$$\boxed{\frac{x^2}{4} + \frac{y^2}{25} = 1}$$

$$a=5, b=2$$

major axis is vertical

So bigger number

is under y.

30) Find Equation Given.

Foci =  $(0, \pm 3)$  vertices =  $(0, \pm 5)$

$$\boxed{\frac{x^2}{16} + \frac{y^2}{25} = 1}$$

$$\begin{array}{cc} \underline{a=5} & \underline{c=3} \\ \text{(vertices)} & \text{(Foci)} \end{array}$$

$$\begin{aligned} c^2 &= a^2 - b^2 \\ 9 &= 25 - b^2 \end{aligned}$$

$$b^2 = 25 - 9$$

$$b^2 = 16$$

$$\underline{\underline{b=4}}$$

of 78482 # 2)

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

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

$a = 4$  Vertices =  $(\pm 4, 0)$

Major axis =  $2(4) = 8$

Minor axis =  $2(1) = 2$

Center =  $(0, 0)$

Foci  $c^2 = a^2 - b^2$   
 $c^2 = 16 - 1 = 15$

$c = \pm \sqrt{15}$   
 $(\pm \sqrt{15}, 0)$

$b = \pm 1$   
 $(0, 1)$   
 $(0, -1)$

Center  $(3, -3)$

$(0, 0) \rightarrow (3, -3)$

$(4, 0) \rightarrow (7, -3)$  ] vertices

$(-4, 0) \rightarrow (-1, -3)$

Foci  $(\sqrt{15}, 0) \rightarrow (3 + \sqrt{15}, -3)$

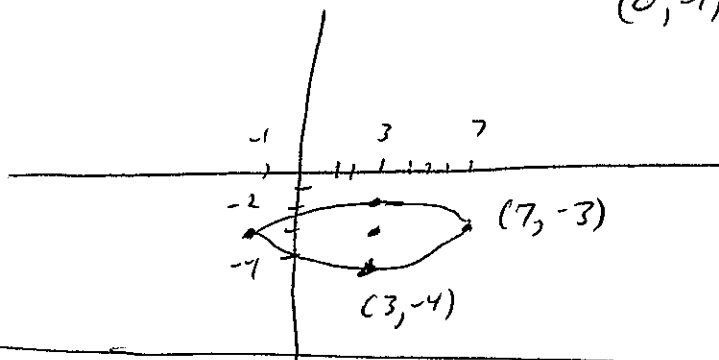
$(-\sqrt{15}, 0) \rightarrow (3 - \sqrt{15}, -3)$

Major axis = 8

Minor axis = 2

$(0, 1) \rightarrow (3, -2)$

$(0, -1) \rightarrow (3, -4)$



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

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

$a = \pm 2$   $b = \pm 1$

Vertices =  $(\pm 2, 0)$

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

$c^2 = 4 - 1$

$c = \pm \sqrt{3}$

$(\pm \sqrt{3}, 0)$

Shift = Left 2  $(-2, 0)$

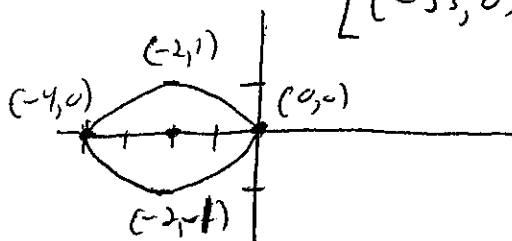
Center  $(0, 0) \rightarrow (-2, 0)$

Vertices  $\left[ \begin{array}{l} (-2, 0) \rightarrow (-4, 0) \\ (2, 0) \rightarrow (0, 0) \end{array} \right]$

B  $(0, -1) \rightarrow (-2, -1)$

$(0, 1) \rightarrow (-2, 1)$

Foci  $\left[ \begin{array}{l} (\sqrt{3}, 0) \rightarrow (\sqrt{3} - 2, 0) \\ (-\sqrt{3}, 0) \rightarrow (-\sqrt{3} - 2, 0) \end{array} \right] (-2 \pm \sqrt{3}, 0)$



16) major axis = vertical

center =  $(2, -3)$

$a = \pm 3$

$b = \pm 2$

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

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

