

Ellipses – Graphing WS

Name Key

Graph each ellipse. Find the center, vertices, covertices, foci, and lengths of the major and minor axes for each ellipse whose equation is given.

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

c (0,0)

v (0,4) (0,-4)

cv (-2,0) (2,0)

F (0,2√3) (0,-2√3)

major length = 8

minor length = 4

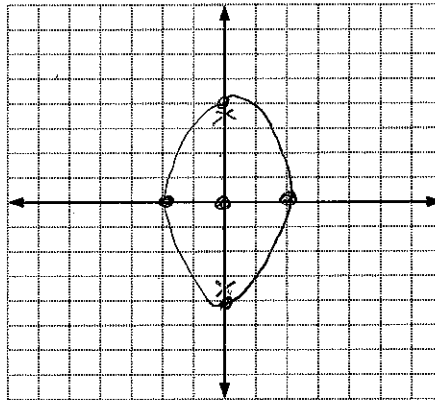
$c^2 = a^2 - b^2$

$c^2 = 16 - 4$

$c^2 = 12$

$c = 2\sqrt{3}$

≈ 3.5



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

c (0,0)

v (3,0) (-3,0)

cv (0,2) (0,-2)

F (√5,0) (-√5,0)

major length = 6

minor length = 4

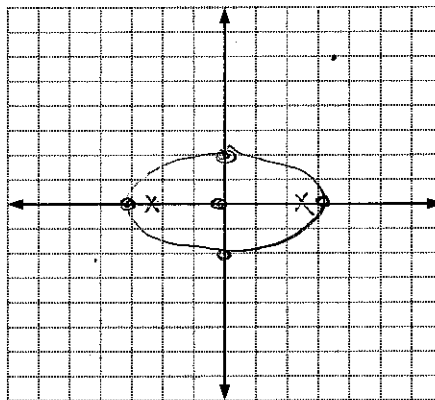
$c^2 = a^2 - b^2$

$c^2 = 9 - 4$

$c^2 = 5$

$c = \sqrt{5}$

≈ 2.2



3. $\frac{4x^2}{324} + \frac{81y^2}{324} = 1$ $\frac{x^2}{9} + \frac{y^2}{4} = 1$
 (hint: Divide the equation by 324.)

c (0,0)

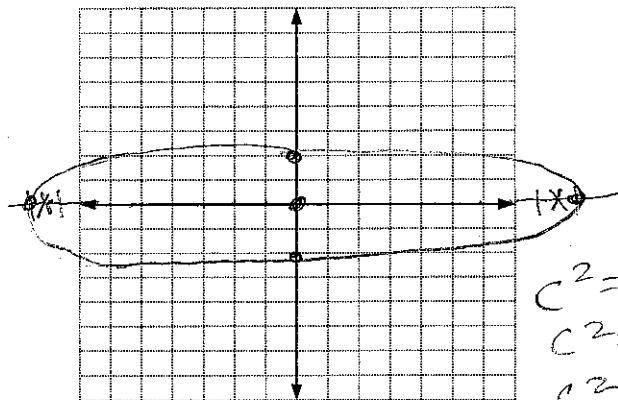
v (-9,0) (9,0)

cv (0,2) (0,-2)

F (-√77,0) (√77,0)

major length = 18

minor length = 4



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

$c^2 = 81 - 4$

$c^2 = 77$

$c = \sqrt{77}$

≈ 8.8

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

$$C (2, -3)$$

$$V (2, 0) \quad (2, -6)$$

$$CV (0, -3) \quad (4, -3)$$

$$F (2, -3 \pm \sqrt{5})$$

$$\text{major length} = \underline{6}$$

$$\text{minor length} = \underline{4}$$

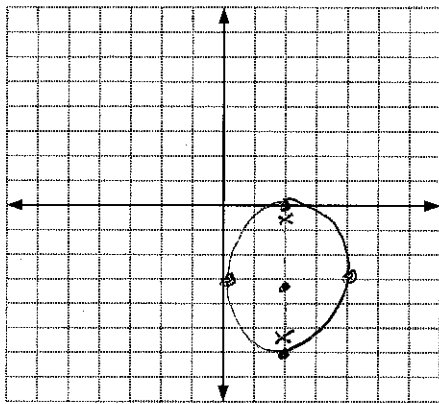
$$c^2 = a^2 - b^2$$

$$c^2 = 9 - 4$$

$$c^2 = 5$$

$$c = \sqrt{5}$$

$$\approx 2.2$$



$$6. \frac{(x+2)^2}{24} + \frac{(y-4)^2}{11} = 1$$

$$C (-2, 4)$$

$$V (0, 4) \quad (-4, 4)$$

$$CV (-2, 3) \quad (-2, 5)$$

$$F (-2 \pm \sqrt{3}, 4)$$

$$\text{major length} = \underline{4}$$

$$\text{minor length} = \underline{2}$$

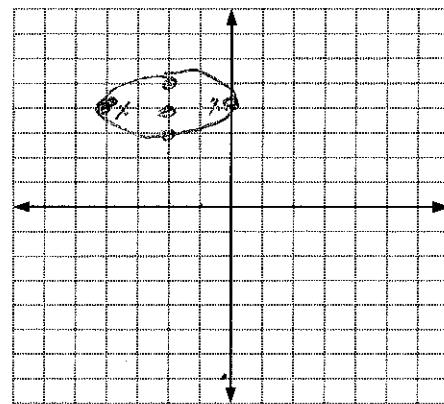
$$c^2 = a^2 - b^2$$

$$c^2 = 4 - 1$$

$$c^2 = 3$$

$$c = \sqrt{3}$$

$$\approx 1.7$$



$$5. \frac{(x+4)^2}{5} + \frac{y^2}{16} = 1$$

$$C (-4, 0)$$

$$V (1, 0) \quad (-9, 0)$$

$$CV (-4, 4) \quad (-4, -4)$$

$$F (-1, 0) \quad (-7, 0)$$

$$\text{major length} = \underline{10}$$

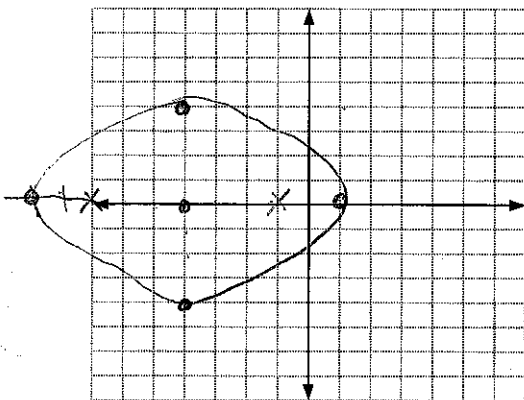
$$\text{minor length} = \underline{8}$$

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

$$c^2 = 25 - 16$$

$$c^2 = 9$$

$$c = 3$$



$$7. \frac{(x-3)^2}{25} + \frac{(y+3)^2}{36} = 1$$

$$C (3, -3)$$

$$V (3, 3) \quad (3, -9)$$

$$CV (-2, -3) \quad (8, -3)$$

$$F (3, -3 \pm \sqrt{11})$$

$$\text{major length} = \underline{12}$$

$$\text{minor length} = \underline{10}$$

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

$$c^2 = 36 - 25$$

$$c^2 = 11$$

$$c = \sqrt{11}$$

$$\approx 3.3$$

