

For the following ellipse equations, name the center, then determine a, b and c. All square root answers must be in simplest form.

1) $\frac{x^2}{25} + \frac{y^2}{100} = 1$

C = (0, 0)

a = 10 $c^2 = 100 - 25$
 $c^2 = 75$

b = 5 $c = \sqrt{75}$
 $c = \sqrt{25}\sqrt{3}$

c = $5\sqrt{3}$ $c = 5\sqrt{3}$

2) $\frac{(x+5)^2}{36} + \frac{(y-9)^2}{4} = 1$

C = (-5, 9)

a = 6 $c^2 = 36 - 4$
 $c^2 = 32$

b = 2 $c = \sqrt{32}$
 $c = \sqrt{16}\sqrt{2}$

c = $4\sqrt{2}$ $c = 4\sqrt{2}$

3) $\frac{x^2}{40} + (y-1)^2 = 1$

C = (0, -1) $a^2 = 40$
 $a = \sqrt{40}$

a = $2\sqrt{10}$ $a = \sqrt{4}\sqrt{10}$
 $a = 2\sqrt{10}$

b = 1 $c^2 = 40 - 1$
 $c^2 = 39$

c = $\sqrt{39}$ $c = \sqrt{39}$

4) $5x^2 + 10y^2 = 20$

C = (0, 0)

a = 2

b = $\sqrt{2}$

c = $\sqrt{2}$

$\frac{5x^2}{20} + \frac{10y^2}{20} = \frac{20}{20}$

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

$c^2 = 4 - 2$

$c^2 = 2$

$c = \sqrt{2}$

5) $8(x+1)^2 + 2(y+1)^2 = 32$

C = (-1, -1)

a = 4

b = 2

c = $2\sqrt{3}$

$\frac{8(x+1)^2}{32} + \frac{2(y+1)^2}{32} = \frac{32}{32}$

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

$c^2 = 16 - 4$

$c^2 = 12$

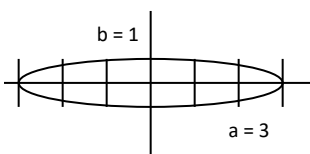
$c = \sqrt{12}$

$c = \sqrt{4}\sqrt{3}$

$c = 2\sqrt{3}$

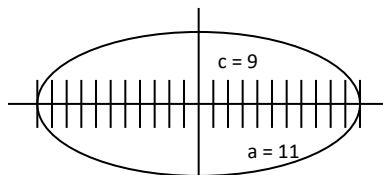
Each of the following ellipses have their center at the origin. Determine the equation of the ellipse.

- 6) Vertex = (3, 0)
minor axis = 2 units



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

- 7) Vertex = (11, 0)
Focus = (9, 0)



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

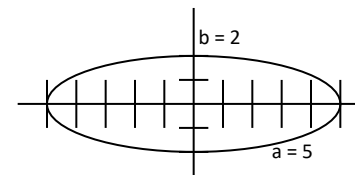
$9^2 = 11^2 - b^2$

$81 = 121 - b^2$

$40 = b^2$

$\frac{x^2}{121} + \frac{y^2}{40} = 1$

- 8) major axis (along x-axis) = 10
minor axis = 4 units



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

Graph each ellipse on the graph paper provided. You do not need to label the coordinates on the graph, but write the vertices and foci in the blanks on this page.

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

Vertices: (6, 0) & (-6, 0)

Foci: (4√2, 0) & (-4√2, 0)

$$c^2 = 36 - 4$$

$$c^2 = 32$$

$$c = \sqrt{16} \cdot \sqrt{2}$$

$$c = 4\sqrt{2}$$

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

Vertices: (-3, 6) & (-3, -4)

Foci: (-3, 5) & (-3, -3)

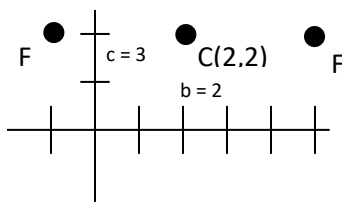
$$c^2 = 25 - 9$$

$$c^2 = 16$$

$$c = 4$$

Each ellipse **does not** have its center at the origin. Determine the equation of the ellipse. Remember, you need the center, "a" and "b" to have enough information to write it.

- 11) Foci = (-1, 2) & (5, 2)
minor axis = 4 units



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

$$3^2 = a^2 - 2^2$$

$$9 = a^2 - 4$$

$$13 = a^2$$

$$\frac{(x-2)^2}{13} + \frac{(y-2)^2}{4} = 1$$

- 12) Center = (2, -5)
Vertex = (2, -1)
Foci = (2, -8)

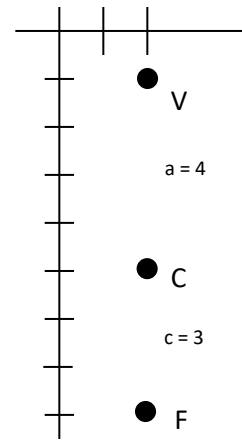
$$c^2 = a^2 - b^2$$

$$3^2 = 16 - b^2$$

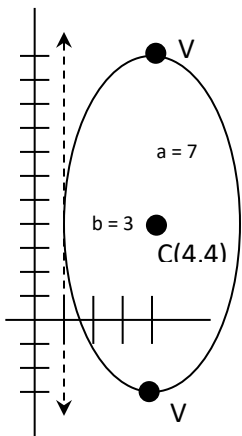
$$9 = 16 - b^2$$

$$7 = b^2$$

$$\frac{(x-2)^2}{7} + \frac{(y+5)^2}{16} = 1$$

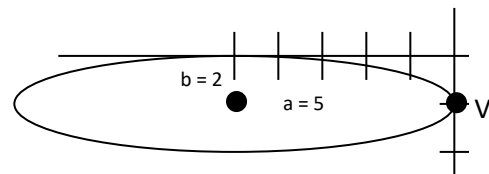


- 13) Vertices = (4, -3) & (4, 11)
Tangent to x = 1



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

- 14) Center = (-5, -2)
Tangent to both the x & y-axes



$$\frac{(x+5)^2}{25} + \frac{(y+2)^2}{4} = 1$$