

Circles

$$(x-h)^2 + (y-k)^2 = r^2$$

(h, k) = Center

r = radius

Recall distance formula

$$\bullet \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$$

• Radius = $\frac{1}{2}$ diameter

• Complete the square

Ellipse

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

a = x radius (vertical)

b = y-radius (horizontal)

Recall

$$a = \frac{1}{\frac{1}{a}}$$

must be \pm in front of $-(x-h)^2$ and $-(y-k)^2$

Write the equation of the ellipse in standard form

$$x^2 + 9y^2 - 14x + 36y + 49 = 0$$

$$x^2 - 14x + \underline{\quad\quad\quad} + 9(y^2 + 4y + \underline{\quad\quad\quad}) = -49 + \underline{\quad\quad\quad} + 9(\underline{\quad\quad\quad})$$

$$x^2 - 14x + \left(\frac{-14}{2}\right)^2 + 9\left(y^2 + 4y + \left(\frac{4}{2}\right)^2\right) = -49 + 49 + \underline{36}$$

$$\frac{(x-7)^2}{36} + \frac{9(y+2)^2}{36} = \frac{36}{36}$$

$$\frac{(x-7)^2}{36} + \frac{(y+2)^2}{4} = 1$$

Center $(7, -2)$

x-radius $= 6 = a$

y-radius $= 2 = b$

find 4 Endpoints

[2 vertical]

[2 Horizontal]

$(7+6, -2)$ $(7-6, -2)$

$(7, -2+2)$ $(7, -2-2)$