

70 a) $x^2 - 4x - 4y = 0$ PARÁBOLA

$$(x-2)^2 - 4 - 4y = 0$$

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

$$(x-2)^2 = 4(y+1) \quad \text{Vértice } (2, -1)$$

$$\downarrow 4 = 2p \rightarrow p = 2$$

$$F \left(0, \frac{p}{2} \right) + \text{Vértice} \rightarrow F(2, 0)$$

$$\text{Directriz } y = -\frac{p}{2} + \text{Vértice} \rightarrow y = -2$$

b) $x^2 + y^2 + 6x - 10y + 33 = 0$ CIRCUNFERENCIA

$$A = -2a \rightarrow 6 = -2a \rightarrow a = -3$$

$$B = -2b \rightarrow -10 = -2b \rightarrow b = 5$$

$$C = a^2 + b^2 - r^2 \rightarrow 33 = 9 + 25 - r^2 \rightarrow -1 = -r^2 \rightarrow r = 1$$

$$(x+3)^2 + (y-5)^2 = 1 \quad \begin{array}{l} C(-3, 5) \\ r = 1 \end{array}$$

c) $9x^2 - 4y^2 - 24y - 72 = 0$ HIPÉRBOLA

$$9x^2 - 4(y^2 + 6y) - 72 = 0$$

$$9x^2 - 4[(y+3)^2 - 9] - 72 = 0$$

$$9x^2 - 4(y+3)^2 + 36 - 72 = 0$$

$$9x^2 - 4(y+3)^2 - 36 = 0$$

$$9x^2 - 4(y+3)^2 = 36$$

$$\frac{9x^2}{36} - \frac{4(y+3)^2}{36} = \frac{36}{36} \Rightarrow \frac{x^2}{4} - \frac{(y+3)^2}{9} = 1$$

$$a = 3$$

$$b = 2$$

$$C(0, -3)$$

$$c^2 = a^2 + b^2$$

$$c = \sqrt{9+4} = \sqrt{13}$$

$$A(0, a) + C \rightarrow A(0, 0)$$

$$A'(0, -a) + C \rightarrow A'(0, -6)$$

$$F(0, c) + C \rightarrow F(0, \sqrt{13} - 3)$$

$$F'(0, -c) + C \rightarrow F'(0, -\sqrt{13} - 3)$$

$$e = \frac{c}{a} = \frac{\sqrt{13}}{3}$$