

d) $3x^2 + 4y^2 - 18x + 16y + 31 = 0$ ELIPSE

$$3(x^2 - 6x) + 4(y^2 + 4y) + 31 = 0$$

$$3[(x-3)^2 - 9] + 4[(y+2)^2 - 4] + 31 = 0$$

$$3(x-3)^2 - 27 + 4(y+2)^2 - 16 + 31 = 0$$

$$3(x-3)^2 + 4(y+2)^2 - 12 = 0$$

$$3(x-3)^2 + 4(y+2)^2 = 12$$

$$\frac{3(x-3)^2}{12} + \frac{4(y+2)^2}{12} = \frac{12}{12} \Rightarrow \frac{(x-3)^2}{4} + \frac{(y+2)^2}{3} = 1$$

$$C(3, -2)$$

$$a=2$$

$$b=\sqrt{3}$$

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

$$4 = 3 + c^2$$

$$c=1$$

$$A(a, 0) + C \rightarrow A(5, -2)$$

$$A'(-a, 0) + C \rightarrow A'(1, -2)$$

$$B(0, b) + C \rightarrow B(3, \sqrt{3}-2)$$

$$B'(0, -b) + C \rightarrow B'(3, -\sqrt{3}-2)$$

$$F(c, 0) + C \rightarrow F(4, -2)$$

$$F'(-c, 0) + C \rightarrow F'(2, -2)$$

$$e = \frac{1}{2} < 1$$

e) $25x^2 - 144y^2 + 288y - 3744 = 0$ HIPÉRBOLA

$$25x^2 - 144(y^2 - 2y) - 3744 = 0$$

$$25x^2 - 144[(y-1)^2 - 1] - 3744 = 0$$

$$25x^2 - 144(y-1)^2 + 144 - 3744 = 0$$

$$25x^2 - 144(y-1)^2 - 3600 = 0$$

$$25x^2 - 144(y-1)^2 = 3600$$

$$\frac{25x^2}{3600} - \frac{144(y-1)^2}{3600} = \frac{3600}{3600} \Rightarrow \frac{x^2}{144} - \frac{(y-1)^2}{25} = 1$$

$$C(0, 1)$$

$$a=12$$

$$b=5$$

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

$$c = \sqrt{144 + 25} = 13$$

$$A(a, 0) + C \rightarrow A(12, 1)$$

$$A'(-a, 0) + C \rightarrow A'(-12, 1)$$

$$F(c, 0) + C \rightarrow F(13, 1)$$

$$F'(-c, 0) + C \rightarrow F'(-13, 1)$$

$$e = \frac{13}{12} > 1$$