SOLUCIÓN GENERAL
EDO(1)NL

$$F(x,y) = C_1$$

$$x^3 + 8x^2y - 6xy + 12xy^2 - 18y^3 = C_1$$

ED → $\frac{\partial F}{\partial x} + \frac{\partial F}{\partial y} \cdot \frac{dy}{dx} = 0$

$$\underbrace{(3x^2 + 16xy - 6y + 12y^2)}_{M} + \underbrace{(8x^2 - 6x + 24xy - 54y^2)}_{N} \cdot \frac{dy}{dx} = 0$$

EDO(1)NL

$$\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$$

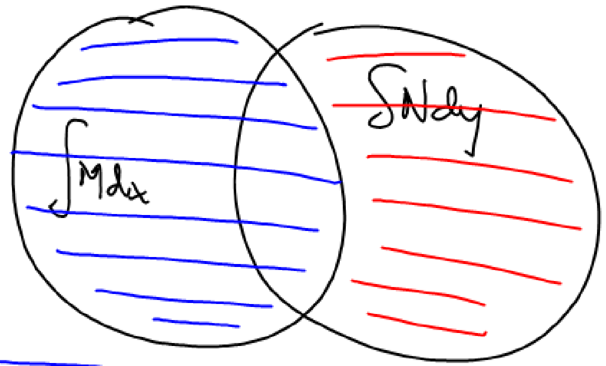
$$\frac{\partial M}{\partial y} = 16x - 6 + 24y \qquad \frac{\partial N}{\partial x} = 16x - 6 + 24y$$

∴ LA EDO(1)NL ES EXACTA.

SI UNA EDO(1)NL ES EXACTA.

$$\int M(x,y)\,dx \qquad \int N(x,y)\,dy$$

$$M(x,y) + N(x,y)\frac{dy}{dx} = 0$$



SOLUCIÓN GENERAL

$$\left[\int M(x,y)\,dx\right] \cup \left[\int N(x,y)\,dy\right] = C_1$$

$$\int M\,dx + \int N\,dy - \left[\int M\,dx \cap \int N\,dy\right] = C_1$$

$$\Rightarrow \longrightarrow \frac{\partial F}{\partial x} + \frac{\partial F}{\partial y}\cdot\frac{dy}{dx} = 0$$

$$\left(\underbrace{3x^2+16xy-6y+12y^2}_{M}\right) + \left(\underbrace{8x^2-6x+24xy-54y^2}_{N}\right)\frac{dy}{dx} = 0$$

EDO(1)NL

$$\int M(x,y)\,dx = 3\int x^2dx + 16y\int x\,dx - 6y\int dx + 12y^2\int dx$$

$$= x^3 + 8yx^2 - 6yx + 12y^2x$$

$$\int M\,dx = \boxed{x^3 + 8x^2y - 6xy + 12xy^2}$$

$$\int N(x,y)\,dy = 8x^2\int dy - 6x\int dy + 24x\int y\,dy - 54\int y^2dy$$

$$\int N\,dy = \boxed{8x^2y - 6xy + 12xy^2 - 18y^3}$$

$$SG = \boxed{8x^2y - 6xy + 12xy^2 + x^3 - 18y^3 = C_1}$$

$$x^3 \quad 8x^2y - 6xy + 12xy^2 \quad 18y^3$$

$$\int M\,dx \qquad \int N\,dy$$

$$SG \begin{cases} \int M\,dx + \int\left[N - \frac{\partial}{\partial y}\int M\,dx\right]dy = C_1 \\ \int N\,dy + \int\left[M - \frac{\partial}{\partial x}\int N\,dy\right]dx = C_1 \end{cases}$$

$$\int M\,dx = x^3 + 8x^2y - 6xy + 12xy^2$$

$$\int N\,dy = 8x^2y - 6xy + 12xy^2 + 18y^3$$

$$\left[x^3 + 8x^2y - 6xy + 12x^2\right] + \int \left[\cancel{8x^2} - \cancel{6x} + \cancel{24xy} - 54y^2 - \cancel{8x^2} + \cancel{6x} - \cancel{24xy}\right] dy = C_1$$

$$x^3 + 8x^2y - 6xy + 12xy^2 + \int (-54y^2)\,dy = C_1$$

$$x^3 + 8x^2y - 6xy + 12xy^2 - 18y^3 = C_1$$

219. $$\left(\frac{x}{\sqrt{x^2+y^2}}+\frac{1}{x}+\frac{1}{y}\right)dx+\left(\frac{y}{\sqrt{x^2+y^2}}+\frac{1}{y}-\frac{x}{y^2}\right)dy=0.$$

220. $$\left(3x^2\operatorname{tg} y-\frac{2y^3}{x^3}\right)dx+\left(x^3\sec^2 y+4y^3+\frac{3y^2}{x^2}\right)dy=0.$$