MÉTODO FACTOR INTEGRANTE.

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

$$\frac{\partial M}{\partial y} \neq \frac{\partial N}{\partial x} \quad \text{NO EXACTA.}$$

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

FACTOR INTEGRANTE.

EXACTA

$$\frac{\partial}{\partial y}FM = \frac{\partial}{\partial x}FN$$

$$\frac{\partial}{\partial y} FM = \frac{\partial}{\partial x} FN$$

$$\boxed{F\frac{\partial M}{\partial y} + M\frac{\partial}{\partial y}F = F\frac{\partial N}{\partial x} + N\frac{\partial F}{\partial x}}$$

$$F(x,y) \Rightarrow F(x)$$

$$F\frac{\partial M}{\partial y} + M\cdot(0) = F\frac{\partial N}{\partial x} + N\frac{dF}{dx}$$

$$N\frac{dF}{dx} = -F\frac{\partial N}{\partial x} + F\frac{\partial M}{\partial y}$$

$$N\,dF = F\left(\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x}\right)dx$$

$$\frac{dF}{F} = \left(\frac{\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x}}{N}\right)dx$$

$g(x)$

$$\frac{dF(x)}{F(x)} = g(x)\,dx$$

$$\int\frac{dF}{F} = \int g(x)\,dx$$

$$\ln F = \int g(x)\,dx$$

$$F = e^{\int g(x)\,dx}.$$

$$(x+y^2) - 2xy\frac{dy}{dx} = 0 \quad \text{NO EXACTA.}$$

$$M = x+y^2 \qquad \frac{\partial M}{\partial y} = 2y$$

$$N = -2xy \qquad \frac{\partial N}{\partial x} = -2y \qquad \frac{\partial M}{\partial y} \neq \frac{\partial N}{\partial x}$$

$$\frac{dF}{F} = \left(\frac{2y-(-2y)}{-2xy}\right)dx$$

$$= \frac{4y}{-2xy}\,dx$$

$$\frac{dF}{F} = \frac{-2}{x}\,dx$$

$$\int\frac{dF}{F} = -2\int\frac{dx}{x}$$

$$\ln F = -2\ln x$$

$$\ln F = \ln x^{-2}$$

$$\boxed{F = \frac{1}{x^2}}$$

$$(x+y^2) - 2xy\frac{dy}{dx} = 0 \qquad \text{~~no~~ EXACTA}$$

$$\left(\frac{x+y^2}{x^2}\right) - \frac{2xy}{x^2}\frac{dy}{dx} = 0$$

$$\underbrace{\left(\frac{1}{x} + \frac{y^2}{x^2}\right)}_{MM} - \underbrace{\frac{2y}{x}}_{NN}\frac{dy}{dx} = 0$$

$$\frac{\partial MM}{\partial y} = \frac{2y}{x^2} \qquad \frac{\partial NN}{\partial x} = \frac{2y}{x^2}$$

$$\int MM\,dx + \int\left(\left(NN - \frac{\partial}{\partial y}\int M\,dx\right)\right)dy = C_1$$

$$\int MM\,dx = \int\left(\frac{1}{x} + \frac{y^2}{x^2}\right)dx$$

$$= \int\frac{dx}{x} + y^2\int\frac{dx}{x^2}$$

$$= Lx + y^2\left(-\frac{1}{x}\right)$$

$$\int MM\,dx = Lx - \frac{y^2}{x}$$

$$SG \Rightarrow \left(Lx - \frac{y^2}{x}\right) + \int\left(-\frac{2y}{x} + \frac{2y}{x}\right)dy = C_1$$

$$\boxed{Lx - \frac{y^2}{x} = C_1}$$

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

$$\frac{\partial M}{\partial y} \neq \frac{\partial N}{\partial x} \quad \text{NO EXACTA.}$$

FACTOR INTEGRANTE.

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

$$F\frac{\partial M}{\partial y} + M\frac{dF}{dy} = F\frac{\partial N}{\partial x} + (0)$$

$$M\frac{dF}{dy} = F\left(\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y}\right)$$

$$\frac{dF}{F} = \left(\frac{\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y}}{M}\right) dy$$

$$(2xy^2 - 3y^3) + (7 - 3xy^2)\frac{dy}{dx} = 0$$

$$\frac{\partial M}{\partial y} = 4xy - 9y^2$$

$$\frac{\partial N}{\partial x} = (0) - 3y^2$$

NO EXACTA.

$f(x)$ –

$$\frac{df}{f} = \left(\frac{4xy - 9y^2 + 3y^2}{7 - 3xy^2}\right)dx$$

$$= \left(\frac{4xy - 6y^2}{7 - 3xy^2}\right)dx$$

NO SE PUDO

$g(y)$

$$\frac{dg}{g} = \left(\frac{-3y^2 - (4xy - 9y^2)}{2xy^2 - 3y^3}\right)dy$$

$$\left(\frac{-3y^2 - 4xy + 9y^2}{2xy^2 - 3y^3}\right)dy$$

$$\left(\frac{-4xy + 6y^2}{2xy^2 - 3y^3}\right)dy$$

$$\left(\frac{-2(2x\cancel{y} - 3y^2)}{y(2x\cancel{y} - 3y^2)}\right)dy$$

$$\frac{dg}{g} = -\frac{2}{y}\,dy$$

$$\int \frac{dg}{g} = -2\int \frac{dy}{y}$$

$$\ln g = -2\ln y$$

$$\ln g = \ln y^{-2}$$

$$g(y) = \frac{1}{y^2}$$

$$(2xy^2 - 3y^3) + (7 - 3xy^2)\frac{dy}{dx} = 0$$

$$g(y) = \frac{1}{y^2}$$

$$(2x - 3y) + \left(\frac{7}{y^2} - 3x\right)\frac{dy}{dx}$$

MM $\qquad$ NN

EXACTA. $\quad \frac{\partial MM}{\partial y} = -3 \qquad \frac{\partial NN}{\partial x} = -3$

$$\int MM\,dx = 2\int x\,dx - 3y\int dx$$

$$= x^2 - 3xy$$

$$Sol = (x^2 - 3xy) + \int\left(\left(\frac{7}{y^2} - 3x\right) - (0 - 3x)\right)dy = C_1$$

$$x^2 - 3xy + 7\int\frac{dy}{y^2} = C_1$$

$$x^2 - 3xy - \frac{7}{y} = C_1$$