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Ec. Dif. Reducibles a exactas por factor integrante

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① $(x+2y^2)\,dx + xy\,dy = 0$

$M\,dx + N\,dy = 0$ | $M_y = 4y$, $N_x = y$

$$p(x) = \frac{M_y - N_x}{N}$$

$$p(y) = \frac{N_x - M_y}{M}$$

$$\frac{M_y - N_x}{N} = \frac{4y - y}{xy} = \frac{3y}{xy} = \frac{3}{x} = p(x)$$

$$f(x) = e^{\int p(x)\,dx}$$

$$e^{\int \frac{3}{x}\,dx} = e^{3\int \frac{dx}{x}} = e^{3\ln x} = e^{\ln x^3} = x^3$$

$$x^3(x+2y^2)\,dx + x^3(xy)\,dy = 0$$

$$(x^4 + 2x^3y^2)\,dx + x^4y\,dx = 0$$

$M\,dx + N\,dy = 0$ | $M_y = 4x^3y$, $N_x = 4x^3y$

$$\int x^4y\,dy = x^4 \int y\,dy = x^4\frac{y^2}{2} + g(x)$$

$$F(x,y) = \frac{1}{2}x^4y^2 + g(x)$$

$$F_x = \tfrac{1}{2}(4x^3)y^2 + g'(x) = 2x^3y^2 + g'(x) = x^4 + 2x^3y^2$$

$$g'(x) = x^4$$

$$g(x) = \int x^4\,dx = \frac{x^5}{5}$$

$$F(x,y) = \tfrac{1}{2}x^4y^2 + x^5/5 = \tfrac{1}{2}x^4y^2 + \frac{x^5}{5} = C$$

R// $= \frac{1}{2}x^4y^2 + \frac{x^5}{5} = C$ //