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**Nombre del trabajo: Ecuaciones
diferenciales mediante sustitución lineal.**

Materia: Ecuaciones diferenciales.

PASIÓN POR EDUCAR

Grado: Tercer cuatrimestre

Grupo: ISC13SDC0119-F

$$\textcircled{1} \frac{dy}{dx} = x + y + 3$$

$$v = x + y + 3$$

$$\frac{dv}{dx} - 1 = v$$

$$dv = dx + dy$$

$$\frac{dv}{dx} = v + 1$$

$$\frac{dv}{dx} = \frac{dx}{dx} + \frac{dy}{dx}$$

$$\frac{dv}{v+1} = dx$$

$$\frac{dv}{dx} - 1 = \frac{dy}{dx}$$

$$\int \frac{dv}{v+1} = \int dx$$

$$\ln(v+1) = x + c_1$$

$$\ln(x+y+3+1) = x + c_1$$

$$x+y+4 = e^{x+c_1}$$

$$x+y+4 = e^x \cdot e^{c_1}$$

$$x+y+4 = Ce^x$$

$$Y = Ce^x - x - 4$$

$$\textcircled{2} \frac{dy}{dx} = 4x - 3y + 4$$

$$\ln(3(4x-3y+4)-4) = -3x + c_2$$

$$v = 4x - 3y + 4$$

$$\ln(12x - 9y + 8) = -3x + c_2$$

$$dv = 4dx - 3dy$$

$$4 - \frac{dv}{dx} = v$$

$$12x - 9y + 8 = e^{-3x + c_2}$$

$$\frac{dv}{dx} = \frac{4dx}{dx} - 3 \frac{dy}{dx}$$

$$4 - \frac{dv}{dx} = 3v$$

$$12x - 9y + 8 = e^{-3x} \cdot e^{c_2}$$

$$\frac{dv}{dx} = 4 - 3 \frac{dy}{dx}$$

$$-\frac{dv}{dx} = 3v - 4$$

$$12x - 9y + 8 = C_3 e^{-3x}$$

$$3 \frac{dy}{dx} = 4 - \frac{dv}{dx}$$

$$\frac{dv}{3v-4} = -dx$$

$$-9y = C_3 e^{-3x} - 12x - 8$$

$$\frac{dy}{dx} = \frac{4 - \frac{dv}{dx}}{3}$$

$$\int \frac{dv}{3v-4} = -\int dx$$

$$Y = Ce^{-3x} - \frac{12}{-4}x - \frac{8}{-4}$$

$$Y = Ce^{-3x} + \frac{6}{2}x + \frac{4}{2}$$

$$\frac{1}{3} \int \frac{3dv}{3v-4} = -\int dx$$

$$Y = Ce^{-3x} + \frac{3}{1}x + \frac{2}{1}$$

$$Y = Ce^{-3x} + 3x + 2$$

$$\frac{1}{3} \ln(3v-4) = -x + c_1$$

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

$$\frac{dv}{dx} - 1 = v^2$$

$$\frac{dv}{dx} = v^2 + 1$$

$$\frac{dv}{v^2+1} = dx$$

$$\int \frac{dv}{v^2+1} = \int dx$$

$$\arctan v = x + c$$

$$\arctan(x+y-7) = x + c$$

$$x+y-7 = \tan(x+c)$$

$$y = \tan(x+c) - x + 7$$

$$v = x + y - 7$$

$$dv = dx + dy$$

$$\frac{dv}{dx} = \frac{dy}{dx} + 1$$

$$\frac{dv}{dx} - 1 = \frac{dy}{dx}$$