



**Nombre del alumno: Johanne Joaquín
Arriaga Díaz**

**Nombre del profesor: Herrera Ordoñez
Magner Joel**

**Nombre del trabajo: Ecuaciones
diferenciales con valor inicial**

Materia: Ecuaciones diferenciales

PASIÓN POR EDUCAR

Grado: Tercer cuatrimestre

Grupo: ISC13SDC0119-F

$$\textcircled{1} 2 + e^{-4x} y' = 0$$

$$2 + e^{-4x} \frac{dy}{dx} = 0$$

$$e^{-4x} \frac{dy}{dx} = -2$$

$$e^{-4x} dy = -2 dx$$

$$dy = \frac{-2 dx}{e^{-4x}} = -2 [e^{4x}] dx$$

$$\int dy = - \int 2e^{4x} dx$$

$$Y + C_1 = -2 \int e^{4x} dx$$

$$Y + C_1 = -\frac{2}{1} \left[\frac{1}{4} e^{4x} + C_2 \right]$$

$$Y + C_1 = -\frac{2e^{4x}}{4} + C$$

$$Y = -\frac{2e^{4x}}{4} + C$$

$$2 = -\frac{2e^{4(0)}}{4} + C$$

$$2 = -\frac{2(1)}{4} + C$$

$$2 = -\frac{2}{4} + C$$

$$\frac{2}{1} + \frac{2}{4} = C$$

$$C = \frac{8+2}{4} = \frac{10}{4}$$

$$Y = -\frac{2e^{4x}}{4} + \frac{10}{4}$$

$$u = 4x$$

$$u' = 4$$

$$\frac{du}{dx} = \frac{4}{1}$$

$$\frac{du}{4} = dx$$

$$\int \frac{e^u}{1} \left[\frac{du}{4} \right] = \frac{1}{4} \int e^u du = \frac{1}{4} e^u + C_2$$

$$\frac{1}{4} e^{4x} + C_2$$

$$\textcircled{2} \frac{dy}{dx} = e^{5y} \sin x \quad y(0) = 2$$

$$dy = e^{5y} \sin x dx$$

$$\frac{dy}{e^{5y}} = \sin x dx$$

$$\int \frac{dy}{e^{5y}} = \int \sin x dx$$

$$\int e^{-5y} dy = \int \sin x dx$$

$$-\frac{1}{5} \int e^{-5y} (-5) dy = \int \sin x dx$$

$$-\frac{1}{5} e^{-5y} = -\cos x + C_1$$

$$e^{-5y} = -5(-\cos x + C_1)$$

$$e^{-5y} = 5 \cos x + C$$

$$-5y = \ln(5 \cos x + C)$$

$$Y = -\frac{1}{5} \ln(5 \cos x + C)$$

$$= -\frac{1}{5} \ln(5 \cos(0) + C)$$

$$\frac{5(2)}{-1} = \ln(5(1) + C)$$

$$Y = -\frac{1}{5} \ln(5 \cos x + C)$$

$$2 = -\frac{1}{5} \ln(5 \cos(0) + C)$$

$$\frac{5(0)}{-1} = \ln(5(1) + C)$$

$$0 = \ln(5 + C)$$

$$\ln(5 + C) = 0$$

$$5 + C = e^0$$

$$5 + C = 1$$

$$C = 1 - 5$$

$$C = -4$$

$$(3) 3 + e^{-7x} y' = 0$$

$$3 + e^{-7x} \frac{dy}{dx} = 0$$

$$e^{-7x} \frac{dy}{dx} = -3$$

$$e^{-7x} dy = -3 dx$$

$$dy = \frac{-3 dx}{e^{-7x}} = -4 \left[\frac{1}{e^{-7x}} \right] dx$$

$$dy = -3e^{7x} dx$$

$$\int dy = -\int 3e^{7x} dx$$

$$Y + C_1 = -4 \int e^{7x} dx$$

$$Y + C_1 = -\frac{3}{1} \left[\frac{1}{7} e^{7x} + C_2 \right]$$

$$Y + C_1 = \frac{-3e^{7x}}{7} + C_2$$

$$Y = \frac{-3e^{7x}}{7} + C$$

$$2 = \frac{-3e^{7(0)}}{7} + C$$

$$2 = \frac{-3(1)}{7} + C$$

$$2 = -\frac{3}{7} + C$$

$$\frac{2}{1} + \frac{3}{7} = \frac{14+3}{7} = \frac{17}{7}$$

$$C = \frac{17}{7}$$

$$Y = \frac{-3e^{7x}}{7} + \frac{17}{7}$$

$$u = 7x$$

$$u' = 7$$

$$\frac{du}{dx} = \frac{7}{1}$$

$$\frac{du}{7} = dx$$

$$\int \frac{e^u}{1} \left[\frac{du}{7} \right] = \frac{1}{7} \int e^u du = \frac{1}{7} e^u + C_2$$

$$\frac{1}{7} e^{7x} + C_2$$

$$(4) \frac{dy}{dx} e^{3x+5y} \quad Y(0) = 1$$

$$\frac{dy}{dx} = e^{3x} \cdot e^{5y}$$

$$\frac{dy}{e^{5y}} = e^{3x} dx$$

$$\int e^{-5y} dy = \int e^{3x} dx$$

$$-\frac{1}{5} e^{-5y} = \frac{1}{3} e^{3x} + C$$

*15

$$-3e^{-5y} = 5e^{3x} + C$$

$$-3e^{-5(1)} = 5e^{3(0)} + C$$

$$-3e^{-5} = 5 + C$$