

Nombre: Steven Landajuri, Juan Valle

Curso: PCE14-02

Fecha: 14/11/25

Taller Matemáticas

• Ejercicio 1

$$\frac{dy}{dx} = 3y; \quad y(0) = 2$$

$$dy = 3y dx$$

$$\frac{dy}{y} = 3dx$$

$$\int \frac{1}{y} dy = \int 3 dx$$

$$\ln|y| = 3x + C$$

$$(e^{\ln|y|}) = e^{3x+C}$$

$$y \ln|y| = e^{3x+C}$$

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

$$y = e^{3x} \cdot e^C$$

• Sustitución

$$2 = e^{3(0)} \cdot e^C$$

$$2 = e^0 \cdot e^C$$

$$2 = e^C$$

$$\ln|2| = \ln|e^C|$$

$$\ln|2| = C \ln|e|$$

$$\ln|2| = C(1)$$

$$\ln|2| = C$$

* Ecación

$$y = e^{3x + \ln|2|}$$

Ejercicio 2 $\frac{dy}{dx} = x + y \quad y(0) = 1$

$$\frac{dy}{dx} - y = x$$

Aplicación de fórmula factor integrante

$$\mu(x) = e^{\int P(x) dx}$$

$$\mu(x) = e^{\int -1 dx}$$

$$\mu(x) = e^{-x}$$

$$e^{-x} \left(\frac{dy}{dx} - y \right) = e^{-x} (x) e^{-x}$$

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

$$\frac{d}{dx} (y \cdot e^{-x}) = x e^{-x}$$

$$\int \frac{d}{dx} (y e^{-x}) dx = \int x e^{-x} dx \quad y e^{-x} =$$

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

$$y = e^x (-x e^{-x} - e^{-x} + C) \quad y = -x - 1 + C e^x$$

$$1 = -(0) - 1 + C e^{(0)} \Rightarrow 0 - 1 + C \cdot 1 = -1 + C = 1 \Rightarrow C = 2$$

$$y = 2e^x - x - 1$$

Nombre: Juan Valle Oliver Landaury
Curso: PCEI4-002
Fecha: 14/11/2025.

Taller N° 3.

Ejercicio 1.

$$\textcircled{1} \quad \frac{dy}{dx} = 3y; \quad y(0) = 2$$

$$\frac{1}{y} \frac{dy}{dx} = 3$$

$$\int \frac{dy}{y} = \int 3 dx$$

$$\int \frac{1}{y} dy = 3x + C$$

$$\ln y = 3x + C$$

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

$$y = e^{3x} \cdot e^C$$

$$\textcircled{2} \quad 2 = e^{3x} \cdot e^C$$

$$2 = e^3 \cdot e^C$$

$$2 = e^C$$

$$\ln|2| = \ln|e^C|$$

$$\ln|2| = C \ln|e^C|$$

$$\ln|2| = C(1)$$

$$\ln|2| = C$$

$$\frac{dy}{dx} = x + y ; \quad y(0) = 1$$

$$\frac{dy}{dx} - y = x$$

Factor integrante

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

$$M(x) = e^{\int -1 dx} = e^{-x}$$

$$M(x) = e^{-x}$$

$$e^{-x} \left(\frac{dy}{dx} - y \right) = e^{-x} (x) e^x$$

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

$$\frac{d}{dx} (y e^{-x}) = x e^{-x}$$

$$\int \frac{d}{dx} (y e^{-x}) dx = \int x e^{-x} dx$$

$$\int \frac{d}{dx} (y e^{-x}) dx = \int x e^{-x} dx + C$$

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

$$y e^{-x} = -x e^{-x} - e^{-x} + C \Rightarrow y = -x - 1 + C e^x$$

$$1 = -(-0) - 1 + C e^{0x} \Rightarrow 0 - 1 + 1 = -1 + C \Rightarrow 1 + C = 2$$

$$y = 2e^x - x - 1$$