Tarea Seccion 2.2

① $\frac{dy}{dx} = \operatorname{sen}(5x) = \int dy = \int \operatorname{sen}(5x)\,dx \to y = \int \frac{\operatorname{sen}(u)}{5}\,du$

$y = -\frac{\cos(5x)}{5} + c$

③ $\frac{dx + e^{3x} dy = 0}{e^{3x}} \to \frac{dx}{e^{3x}} = -dy \to \int e^{-3x}\,dx = -\int dy$

$\int \frac{e^{u}}{3}\,du = -y \to \frac{e^{-3x}}{3} + C = y$

④ $dy - (y-1)^2 dx = 0 \to \int \frac{dy}{(y-1)^2} = \int dx \to$

$\int u^{-2} = x \to \frac{u^{-1}}{-1} + C = x \to -\frac{1}{y-1} + C = X$

⑤ $\frac{dy}{4y} = \frac{dx}{x} \to \frac{1}{4}\int\frac{dy}{y} = \int\frac{dx}{x} \to \frac{1}{4}\ln|y| + C = \ln|x|$

$\pm e^{c}(y^{1/4}) = x \to \quad x = C_1 y^{1/4}$ ✓

⑪ $\frac{\csc(y)\,dx + \sec^2(x)\,dy = 0}{\csc(y)\cdot\sec^2(x)} \to \cos^2(x)\,dx = -\operatorname{sen}(y)\,dy$

$\int\cos^2(x)\,dx = -\int\operatorname{sen}(y)\,dy \to \int\frac{1}{2} + \int\frac{\cos(2x)}{2} \to \frac{1}{2}x + \frac{\operatorname{sen}(2x)}{4}$

$-\int\operatorname{sen}(y)\,dy = \cos(y) \to y = \cos^{-1}\left(\frac{1}{2}x + \frac{\operatorname{sen}(2x)}{4} + c\right)$ ✓

⑬ $(e^{y}+1)^2 e^{-y}\,dx + (e^{x}+1)^3 e^{-x}\,dy = 0$

$\left(\frac{e^{2y}}{e^{y}} + \frac{2e^{y}}{e^{y}} + \frac{1}{e^{y}}\right)dx + \left(\frac{e^{3x}}{e^{x}} + \frac{3e^{2x}}{e^{x}} + \frac{3e^{x}}{e^{x}} + \frac{1}{e^{x}}\right)dy = 0$

$\int(4e^{-2x} + e^{x} + \frac{1}{3})\,dx = -\int e^{y} + 2 + e^{-y} \to$

$-2e^{-2x} + e^{x} + \frac{x}{3} + C = -e^{y} - 2y + e^{-y}$ ✓

23 $\frac{dx}{dt} = 4x^2+1$ $\qquad x\left(\frac{\pi}{4}\right) = 1$

$\int \frac{dx}{4x^2+1} = \int dt \to \tan^{-1}(x) = 4t + C \to x = \tan(4t + C)$

$1 = \tan(\pi + C) \to C = \tan^{-1}(1) \to C = \frac{-3\pi}{4}$

$x = \tan\left(4t - \frac{3\pi}{4}\right)$

25 $x^2 \frac{dy}{dx} = y - x^2 y \to x^2 \frac{dy}{dx} = y(1-x) \to \frac{dy}{y} = \frac{(1-x)}{x^2}\,dx$

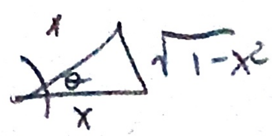
$\ln(y) = \int x^{-2} - x^{-1}\,dx \to \ln|y| = -x - \ln|x| \mp C$

$y = e^{-x} e^{x^{-1}}(\pm e^{c}) \to y = C_1 e^{-x} e^{x^{-1}}$ $\qquad y(-1) = -1$

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

27 $\frac{\cancel{\sqrt{(1-y^2)}}\,dx - \cancel{\sqrt{1-x^2}}\,dy}{\cancel{\sqrt{1-y^2}\left(\sqrt{1-x^2}\right)}} = 0$ $\qquad y(0) = \frac{\sqrt{3}}{2}$

$(1-x^2)^{-1/2}\,dx - (1-y^2)^{-1/2}\,dy = 0 \to$



$\cos\theta = x$

$-\text{sen}\,d\theta = dx$

$\text{sen}\,\theta = \sqrt{1-x^2}$

$\theta = \cos^{-1}(x)$

$\frac{-\text{sen}\,\theta}{\text{sen}\,\theta}\,d\theta = \frac{-\text{sen}\,\theta}{\text{sen}\,\theta}\,d\theta \to -\theta + c = \theta$

$\cos^{-1}(x) + C = \cos^{-1}(y) \to \cos^{-1}(0) + c = \cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

$1.047 = C \to \cos^{-1}(x) + 1.047 = \cos^{-1}(y)$